AMERICAN JOURNAL OF PHARMACY

PUBLISHED BY AUTHORITY OF THE

Philadelphia College of Pharmacy

VOL. 88 — DECEMBER, 1916 — NO. 12

CONTENTS.

Pharmaceutical Exhibit at the Philadelphia College of Pharmacy. By Robert P. Fischelis, B. Sc., Phar. D. 529

Some Constituents of Sumbul Root. By Frederick W. Heyl and Merrill C. Hart. 546

Quarterly Review on the Advances in Materia Medica and Pharmacy. By John K. Thum, Ph. G. Pharmacist at the German Hospital, Philadelphia, Pa. 563

Book Reviews: Annual Reports of the Chemical Laboratory of the American Medical Association, 1915 574

Complimentary Dinner to Professor Samuel P. Sadtler. 575

New Formulæ: Syrup of Ferrous Iodide; Chocolate Syrup 580

Index to Volume 88 581

Price, $3.00 per Annum, in advance — Issued in Monthly numbers of not less than 48 pages

SINGLE NUMBERS, 30 CENTS
BACK NUMBERS, 50 CENTS

Address all communications to
The American Journal of Pharmacy, 145 North Tenth Street, Philadelphia, Pa.

Entered at the Post Office at Philadelphia as second-class matter

American Journal of Pharmacy

ESTABLISHED IN 1825

Four preliminary numbers were published at different times until in 1829, when the publication of the regular volumes began. Since then the publication has been uninterrupted. During the period from 1829 to 1852 four numbers were published annually, except in 1847, when five numbers were published. From 1853 to 1870 six numbers were published. Since this time twelve numbers have been published annually.

Manuscripts should be sent to the Editor. It should be stated in this connection that the Editor does not assume any responsibility in connection with the views or investigations of contributors, other than to exercise general care in the selection of matter.

Contributors are allowed a reasonable number of copies of this JOURNAL, free of charge, if applied for when the proof is returned.

Reprints, if desired, must be applied for when the proof is returned. The table below shows the *approximate* cost of reprints, the make-up of the pages to be identically the same as in the JOURNAL. The actual cost may vary from the figures given, and will depend upon the amount of presswork, paper, binding, etc. Reprints containing half-tones may be expected to cost somewhat more than the rates given.

	2 pp.	4 pp.	8 pp.	16 pp.	COVERS WITH TITLES	
25 copies . .	$2.25	$3.75	$7.75	$9.00	25 copies . .	$1.75
50 " . .	2.50	4.00	8.25	9.75	50 " . .	2.00
100 " . .	2.75	4.25	9.00	10.75	100 " . .	2.25
250 " . .	3.75	4.75	10.00	12.00	250 " . .	2.75

DIED NOVEMBER 25, 1916

Martin J. Wilbert, Ph.M., Phar.D.

MEMBER OF THE
PUBLICATION COMMITTEE OF THIS JOURNAL

A Memoir will appear in a subsequent number

THE AMERICAN
JOURNAL OF PHARMACY

DECEMBER, 1916

PHARMACEUTICAL EXHIBIT AT THE PHILADELPHIA COLLEGE OF PHARMACY.

By Robert P. Fischelis, B.Sc., Phar.D.

When we speak of the Civil War to-day, our thoughts go back vaguely to some period in American history which was considerably "before the time" of any man less than fifty-five years of age, and is little more than an indefinite memory to the man of sixty-five or seventy. When we try to think back still further to the War of 1812, most of us feel that we are bordering on the realm of ancient history. Yet we must go back in thought to less than ten years after the War of 1812 and to about forty years before the opening gun of the Civil War was fired if we are to attempt to visualize the beginning of the first College of Pharmacy in this country.

Almost a century has gone by since that little group of apothecaries of Philadelphia held their memorable meeting in Carpenter's Hall on February 23, 1821, out of which grew the Philadelphia College of Pharmacy. On the date mentioned these Philadelphia pharmacists organized themselves into a society which they called The Philadelphia College of Apothecaries, "for the two-fold purpose of providing a system of instruction in pharmacy and subjecting themselves to regulations in their business."

The very mention of Carpenter's Hall is enough to attract the attention and compel the respect of anyone who has had even the merest smattering of American history. And what is more fitting than that an institution which has grown up to be respected and revered by thousands of loyal alumni and friends should have originated in a building so intimately connected with the early history of the United States? The graduates of the Philadelphia College of Pharmacy, numbering now about 6500, have long ago organized themselves into a powerful Alumni Association, and are responsible for

much of the progress that has been made in the institution since its inception. It was therefore extremely proper that the fiftieth anniversary of the Alumni Association of this College, coming as it did on the occasion of the Sixty-fourth Annual Convention of the American Pharmaceutical Association held at Atlantic City, should be partly celebrated by an historical exhibit covering the activities of the college in the ninety-five years or more of its existence. The exhibit was opened August 30th and was continued until September 30th, 1916.

It goes without saying that it was quite an undertaking for anyone to attempt to do justice in one exhibit to all of the activities of a school of pharmacy, which has wielded as great an influence in professional circles over a span of almost one hundred years, as has the Philadelphia College of Pharmacy. How well and successfully this was done is already a matter of record, and the favorable comments of the many interested people from all corners of the United States, who came to see the exhibit, must have been music to the ears of those who labored so hard to make it a success.

Usually men pay but little attention to history while it is in the making, but age is bound to lend interest to the happenings of past decades. And so it is with pharmacy. If we would but stop to realize how anxious future generations will be to delve into the work of the present day, we would very likely try to make our footprints on the sands of time just as clear-cut and distinct as possible. Fortunately, those who have been and are now active in the management of the Philadelphia College of Pharmacy have always had a due regard for the historical value of things pharmaceutical, and their painstaking efforts in preserving past records showed forth in the exhibit which we are about to describe.

While the major portion of the exhibit was confined to the Museum of the College, the exhibit as a whole really extended over the entire school building. Each laboratory and lecture room had some of its rare collections on view, but the things of greatest interest to the many, were exhibited in the Museum.

The contrast between ideal pharmacy, as it should be practised in the present day and as it was practised in the past, was portrayed most forcibly in the exhibit of the "model pharmacy of the period of 1921," with its laboratories and excellent equipment, on the one hand, and the old Glentworth Drug Store, established in 1812, on the other. A bit of history regarding this old establishment will not be amiss at this point.

THE GLENTWORTH PHARMACY.

George Glentworth opened this historical establishment in 1812 at the northeast corner of Sassafras and Chester Streets, the old number being 287 Sassafras Street. This thoroughfare has since lost its botanical name and is now known as Race Street. In the early days Glentworth's Drug Store was known as a "country drug store." Philadelphians of the present generation will hardly be able to imagine any establishment less than half a dozen blocks' distance from City Hall as a "country store." The Glentworth family conducted this apothecary shop for more than ninety-two years, without making any pronounced alterations or changes in its appearance. We have been told by a member of the Glentworth family that in 1816 or thereabouts, medical and pharmaceutical lectures were given on the second floor of the Glentworth store, and the men who attended these lectures were later instrumental in forming the Philadelphia College of Apothecaries. The certificate of membership in this organization belonging to the elder Glentworth and displayed in his store is dated October, 1821, and as far as is known, this is the only certificate of membership in the Philadelphia College extant, which still bears the old name of "Philadelphia College of Apothecaries," the word "Apothecaries" having been changed to "Pharmacy" in the second year of its existence.

As can be imagined, this store grew to be a Philadelphia landmark and many of its peculiarities were widely discussed. Two of its devices attracted particular attention, one being a sign consisting of an old head that would turn and look first one way and then the other. The second was the old painted owl that greeted the customer from the top of the central fixture as he entered. By means of a mechanical device, this owl could be made to flap its wings, move its eyes and bill and make a noise like the real bird. It is said that the proprietor had a great deal of fun with this contraption, especially in frightening children.

That Glentworth was a firm believer in preparedness is evidenced by the provision he made for taking in and handing out prescriptions after dark. He had a small opening cut into a panel of the main door leading into his store. He fitted a small door over this opening which could, of course, be locked from the inside. There were few, if any policemen in those early days and this arrangement was an early nineteenth century example of the "safety first" idea.

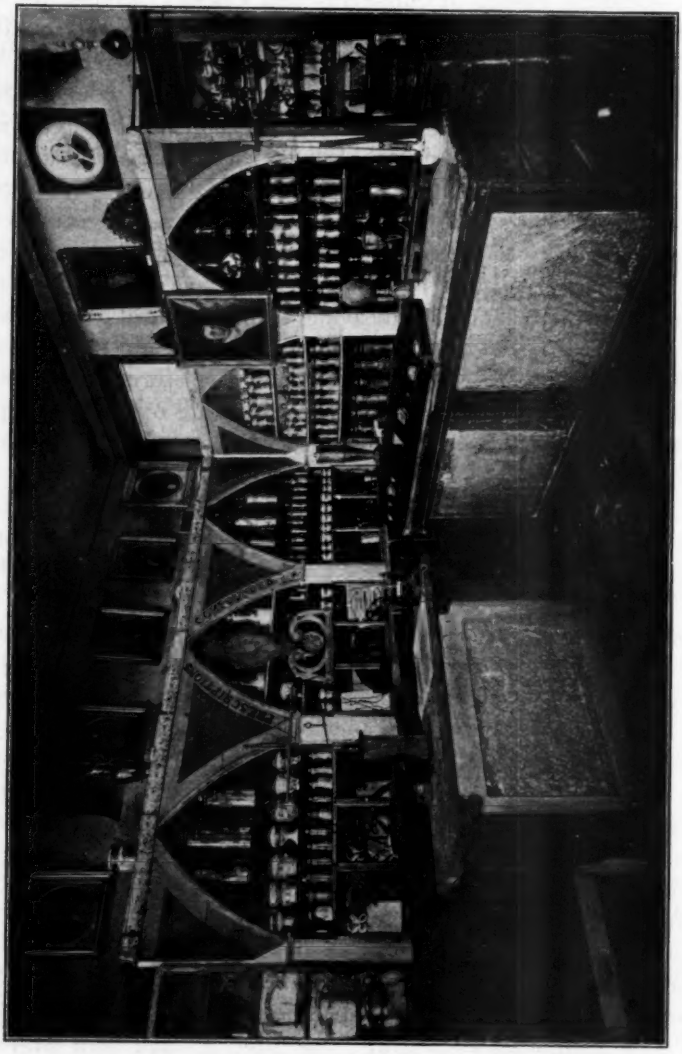


FIG. 1.

An old Philadelphia drug store of the last century.

When someone would come to have a prescription filled after the store was closed for the night, it was necessary to arouse the druggist by means of the night bell. The small door would then be opened and the druggist's hand would reach out after the prescription, after which the door was again locked and the bearer of the prescription waited outside until the medicine was ready. The small door would then be opened again and after the money was handed in, the prescription would be handed out.

The show bottles in this old apothecary shop were filled with applejack said to have been prepared in 1812. Some of this one-time beverage is still in existence, but it has become very heavy and oily in appearance. A few years ago the Philadelphia College of Pharmacy was presented with the fixtures and furnishings of this store intact, and they are now a part of the permanent museum exhibit at the college. For this special Alumni Exhibit the store had been reconstructed, and as one entered the section of the Museum where it was being shown, it seemed as though a curtain had suddenly been raised permitting one to peer into a past age. The fixtures resemble the Gothic type of architecture somewhat. The clerk's sleeping bunk under the counter, as well as the huge night bell, were very much in evidence. The owl, already spoken of as a source of amusement and mystification, was also on display in its accustomed place. On the counter there were the old-time scales, an old triturating and also a contusing mortar, an ancient carbonator for preparing one or two glasses of carbonated water extemporaneously, and the curious old counter show cases filled with many old time proprietary preparations.

Unfamiliar Labels Attract Attention

Many of the drawer labels were no doubt unfamiliar or unintelligible to the younger clerk or druggist who visited the exhibit, but perhaps the older men in the profession have recollections of calls for "Rubia," "Statice" and "Symphytum." Wall case labels included such curiosities as "Cephalic Snuff," "Breast Salve," "Sodiic Powders" and "Cajiput" oil. The large crude unfinished shelf bottles pointed to an age when the manufacture of glassware was still in its infancy. There were two-gallon containers for Tincture of Opium, Camphorated Tincture of Opium, Acid Pyroligneous, Tinctures of Persimmons, Sago, Althæa Flowers, and a five-gallon

FIG. 2.—General view of the exhibition.

container labelled " Duffy's Elixir " which contained applejack, probably one hundred years old. The queer-shaped gaudily decorated jars and gallipots looked very interesting. The general run of stock bottle and jar labels were unintelligible to all but students of pharmaceutical history.

Among the titles noted were:

Flores Zinci, G. Succini Opt., Ethiops Mineral, Sacch. Saturni, Ærugo Dest., Corall. Ppt., Fer. Limat., Crocus Martis, Antim. Vit., Cl. Nicotian., Lytt. Tereginth., Phos. Hydrarg., and Tr. Castor.

It was but a few steps from 1812 to 1921 at the exhibit, but, no doubt the pharmacist who held sway in the old Glentworth store would feel very much out of place in the model pharmacy of 1921, and, very likely, the pharmacist of the present day would feel just as strange in the old-time store.

The Model Pharmacy of 1921.

The first section of the model drug store seen, as one entered from the outside, was fitted up as a salesroom for toilet articles, surgical goods, drugs and the more ethical side lines of the retail store. Proprietary medicines were conspicuous by their absence. In the foreground there was a public telephone booth which seems to be universally recognized as a necessity in every well equipped pharmacy, and in the middle of the floor there was a white-enameled Mulford biological refrigerator for the preservation of biological products, which helped to lend an air of professionalism to the establishment. A swinging door led from the well-furnished salesroom to the prescription department, immediately adjoining. In addition to being equipped with all of the latest devices for facilitating prescription work, there was a complete office equipment in one section of this department,—a desk, an adding machine, a typewriter, a modern accounting system, a safe, and a druggist's five-foot book-shelf holding the indispensable modern works on pharmacy. Here, too, there was an exhibit of filled prescriptions illustrating the proper style of containers and methods of wrapping and finishing packages.

Finishing and Manufacturing Laboratories.

Next to the prescription department there was a completely equipped analytical and biological laboratory with the necessary apparatus for performing physical, chemical and biological tests. A

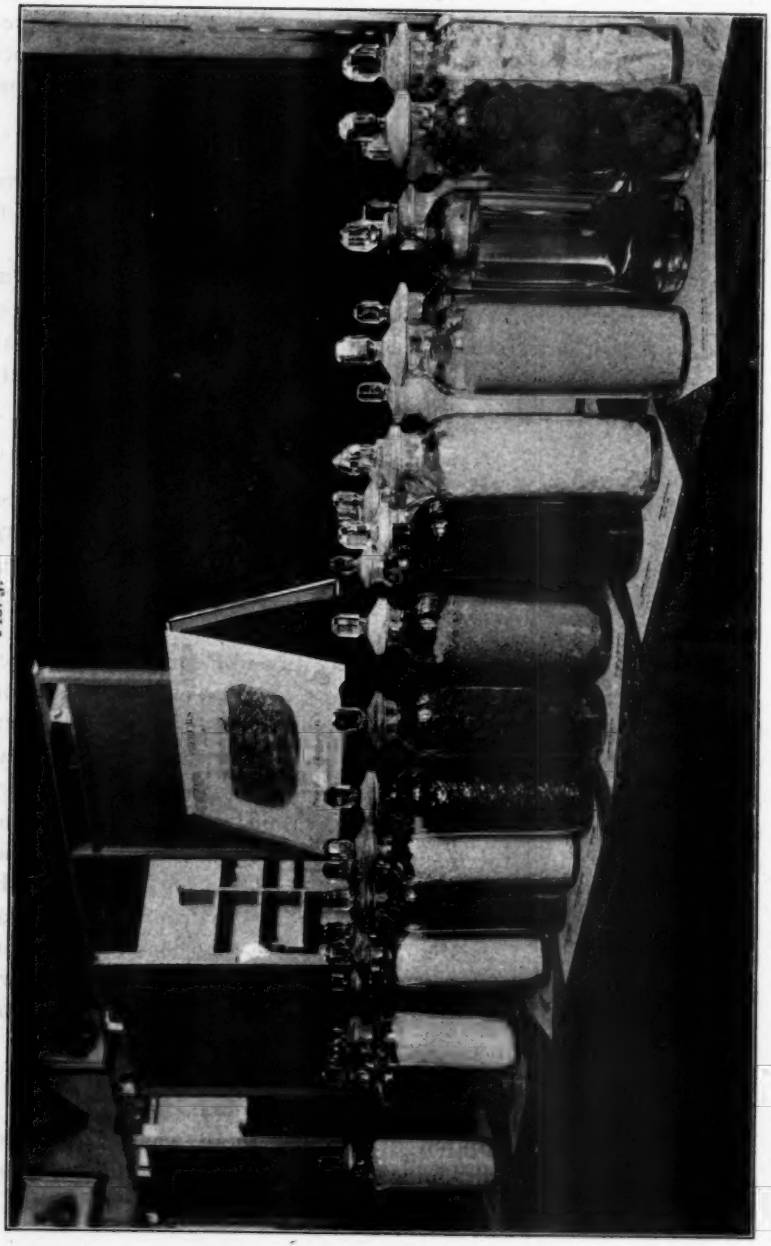


FIG. 3.

Powers-Weightman-Rosengarten's exhibit of high-grade chemicals and crude drugs from which they were made. Photograph by William Phillipi and Brother, Philadelphia.

complete set of reagents necessary to perform the tests of the U. S. P. and N. F. was included, and the autoclave, incubator, microscope, culture tubes, etc., on display were evidences of preparedness for doing such bacteriological work as physicians might require of the pharmacist.

Following the analytical and biological laboratory there came a well equipped manufacturing department with rows of percolators and receiving bottles on a specially constructed rack, a Remington still, funnels, evaporating dishes, tablet machine, and many other pieces of apparatus which are used in the manufacturing department of a first-class store. Finally there was the drug examination laboratory for the study of crude and powdered drugs. This consisted of a type collection of crude and powdered drugs, microscopic sections, drawings and mounted specimens together with instruments for identifying them.

This, in brief, describes the departments of the "model pharmacy of 1921" and while many of those who inspected it may have felt that it was too ideal, yet there are stores at present which are catering to just the kind of work for which the "model" pharmacy was equipped and as time goes on there are bound to be more of them. Even those who have the greatest faith in the future of professional pharmacy do not believe that drug stores generally will so revolutionize themselves by 1921 as to conform to the "model." However, the line of demarcation between purely commercial and purely prescription and laboratory establishments is becoming visible and an official separation may not be as far distant as we are prone to think.

The Martindale Herbarium.

Passing now to some of the other many interesting portions of this historical exhibit, we come first to the Martindale Herbarium. This great collection of American plants was presented to the College by President Howard B. French and Messrs. Smith, Kline and French, April 3, 1894, after having been purchased from the estate of Isaac C. Martindale of Camden, New Jersey.

The collection consists of seven large walnut cases, compactly filled with mounted specimens. It is hardly possible to form any definite idea of the number of plants contained in this herbarium as many of the sheets bear several specimens of certain plants obtained from different localities. A number of these specimens were taken out of the cases and placed in the botanical section of the exhibit. All

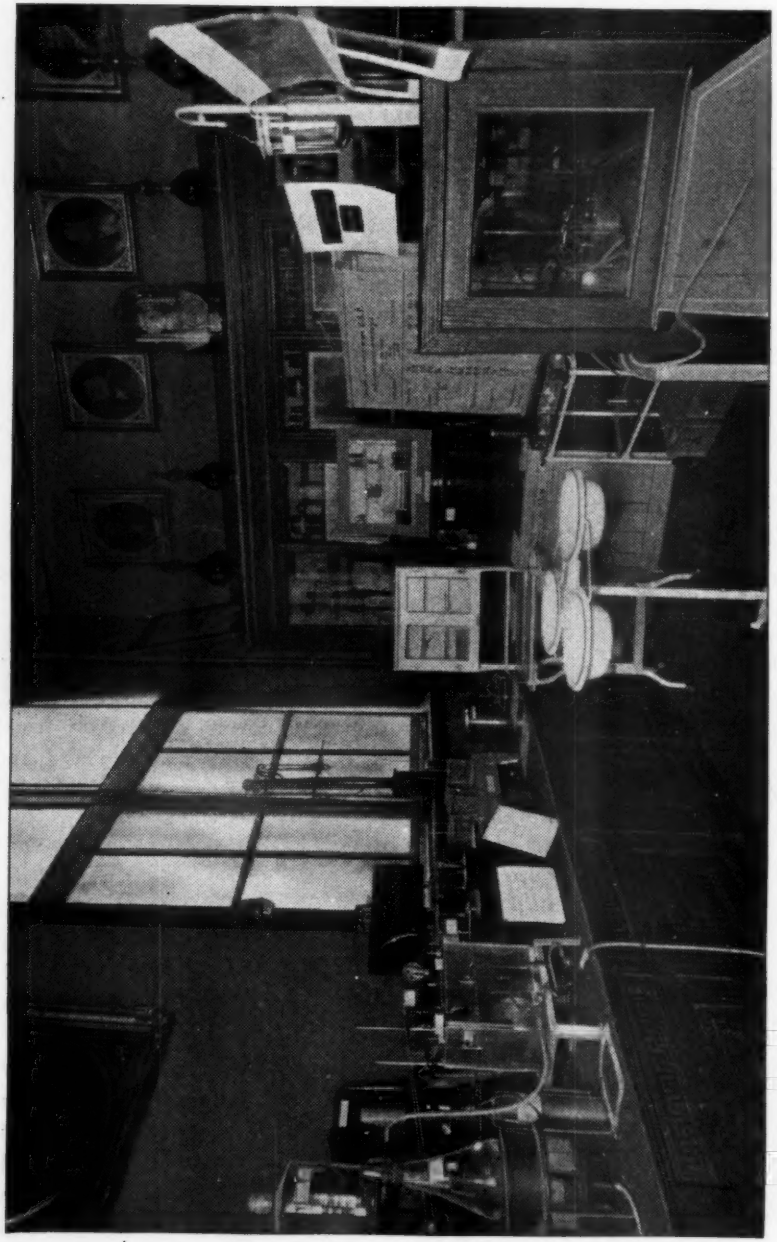


FIG. 4

Partial view of laboratory equipped for carrying on biochemical assaying. To the left is the apparatus used for testing pituitary extract by the isolated uterus method. The Pittenger multiple operating table with kymograph case for blood pressure work on dogs is shown at the extreme right. This laboratory was equipped by the H. K. Mulford Company for the P. C. P. exhibit.

of these were mounted on white paper and properly arranged in heavy manila paper genus covers, and in natural order divisions, the plan of arrangement adopted being that of Durand's Index corresponding with the nomenclature of the Genera Plantarum of Bentham and Hooker.

The systematic arrangement and perfect order of this herbarium have always been admired by visiting botanists and those who viewed this exhibit were not exceptional in this respect. It is estimated that in the collection and arrangement of this magnificent herbarium Mr. Martindale spent at least fifteen thousand dollars. Beyond any statement of its money value, the true value of this collection is in its importance to scientific study and investigations. A detailed account written by Mr. George M. Beringer of the Martindale Herbarium, which, as has already been stated, is a part of the permanent museum collection of the college, was published in the AMERICAN JOURNAL OF PHARMACY, Volume 66, No. 5, page 251.

PHARMACOPŒIAL EXHIBIT.

The copy of the ninth revision of the United States Pharmacopœia shown in one section of the exhibit attracted considerable attention because, at the time of the exhibit, it was new to the majority of pharmacists.

There was also on view a complete set of the Pharmacopœias of the United States and a representative showing of the Pharmacopœias of the several nations of the world. A complete set of the several editions of the United States Dispensatory and a considerable amount of material illustrating the methods employed and the character of the work done by the Committee of Revision of the United States Pharmacopœia were also shown. In this connection mention should be made of the voting and instruction sheets issued by the late Charles Rice, when he was Chairman of the Revision Committee. The painstaking effort and attention to detail displayed in getting up the instructions and other data to be sent to members, with the poor facilities at his command, are certainly worth more than passing comment. A complete set of the earlier Digest of Comments on the Pharmacopœia, and a complete set of the present Digest of Comments on the Pharmacopœia and the National Formulary were displayed and attention was directed to the comprehensiveness of the latter publication by a sign which read:

The Digest of Comments, originated by Charles Rice, has grown to be the greatest work of reference on the U.S.P. and N.F.

Scientific Book Exhibits.

J. B. Lippincott Co., P. Blakiston's Sons & Co., Lea and Febiger, Philadelphia Book Co., and W. B. Saunders & Co., all had extensive exhibits of their scientific books on view and many of the volumes bore, as authors, the names of members of the Philadelphia College faculty, as well as those of prominent alumni who are identified with other schools.

A permanent case in the library of the College contains historic scientific books covering a period of three centuries and along with the book exhibits mentioned above, there were on view volumes belonging to the college dating back to the seventeenth and eighteenth centuries.

Miscellaneous Contributions from the Permanent Museum Exhibit.

Three large glass cases placed in one section of the museum were filled with contributions from the permanent collection of the Philadelphia College Museum. Among these were the first spectroscope made and used in the United States; an ancient sign used by Townsend Speakman (born 1748), the first chemist and druggist in Philadelphia; a Liebig condenser made by Professor J. P. Remington at the age of fourteen; an old-time sand shaking box for blotting letters and wafer seals used in sealing letters before the days of envelopes; a balance taken from the Spanish warship Santa Maria, sunk in Santiago Harbor, July, 1898; an old Russian blast alcohol lamp; an ancient stone retort; the first registration book of Philadelphia druggists, before the State registration act was passed; a complete set of all editions of Remington's "Practice of Pharmacy;" a complete set of the American Journal of Pharmacy, from 1825 to 1916, and original manuscripts and prints used in contributed articles; a complete set of all editions of Kraemer's works on Botany and Pharmacognosy; a bottle of wine made in 1864 by Prof. William Procter; a book of labels of William Procter Jr. Company, Ninth and Lombard Streets, Philadelphia; a model of a Norwegian fishing smack as used in cod fishing; an upright condenser belonging to Prof. Israel J. Graham; a bandage wrapping machine and convalescent feeding bowl as used during the Civil War; a collection of wooden mortars and pestles from Cuba; the first stick of phosphorus made in America and the first specimen of glycerin made in Philadelphia.

Needless to say, all of these very interesting objects attracted favorable attention. The beautiful penmanship shown in the register of Philadelphia druggists mentioned above was the cause of much comment and many visitors deplored the passing of the day when handwriting was still intelligible.

Student Activities Portrayed.

To the present student of pharmacy at the Philadelphia College and to many former students, one of the most fascinating portions of the exhibit was that devoted to recording student activities. There was the "baseball bat of victory" which had seen yeoman service in winning athletic laurels for the blue and white. Pictures of the winning football, baseball and track teams—they are never losing teams—were scattered about. Fraternity and class banquet menus and reception programmes were there in considerable quantity and dating back many years. Then there were those great storehouses of information regarding P. C. P. student life—the volumes of "The Graduate." Christopher Koch, Jr., of the Class of 1899, more than anyone else perhaps, was responsible for the first issue of a class record, and like the initial volume of 1899, edited by Koch, all of its successors have been creditable to the institution and the men which they represent.

A set of students' Weekly Bulletins which were issued for two years also recorded in detail the many things of a social and educational nature which make college life so well worth while.

Bound volumes of the Alumni Report issued monthly until July, 1908, when it was discontinued and superseded by the quarterly Alumni Bulletin, were also on exhibition and many interesting bits of P. C. P. history are contained in its pages.

Pharmaceutical Manufacturers' Exhibits.

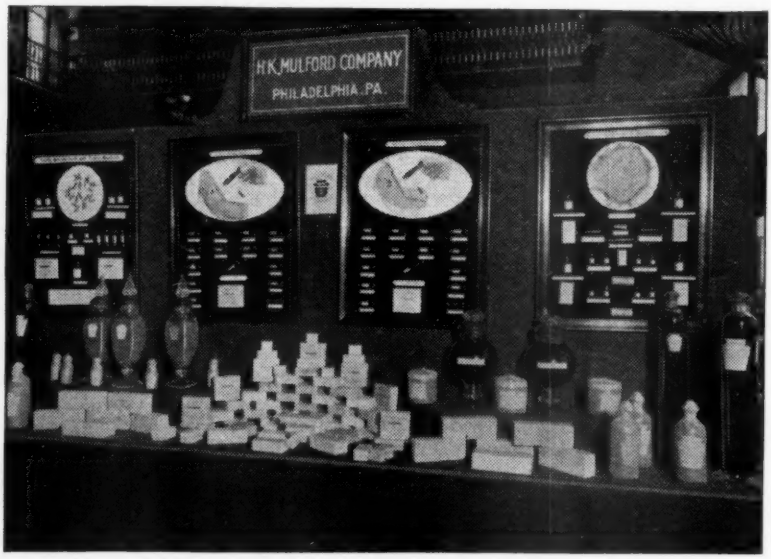
No pharmaceutical exhibit is complete to-day without a section devoted to manufacturing pharmacy and the exhibit under discussion did not omit this important sphere of pharmaceutical activity. It is interesting to note that the fiftieth anniversary of the P. C. P. Alumni Association synchronizes with the fiftieth anniversary of Parke, Davis & Co., of Detroit, Michigan; the fortieth anniversary of Eli Lilly & Co., of Indianapolis, and the twenty-fifth anniversary of the H. K. Mulford Co., of Philadelphia. It is also very interest-

ing to record that the heads of these three great manufacturing concerns are graduates of the Philadelphia College of Pharmacy.

Eli Lilly & Co. showed a sample of atropine made from wild-growing stramonium with the use of Lloyd's reagent and other pharmaceutical products.

The H. K. Mulford Co. had biological and pharmaceutical products on display in addition to the completely equipped Mulford biological refrigerator, which was a part of the fixtures of the "model" pharmacy. Display cases showing bacterins, serobac-

FIG. 5



Some Mulford Biological and Pharmaceutical Products Exhibited at the Philadelphia College of Pharmacy.

terins, antitoxins, vaccines, etc., were a part of the biological exhibit and an attractive line of galenicals was shown in the pharmaceutical exhibit of this concern. However, the portion of the Mulford display which attracted greatest attention was the complete laboratory for biological assaying of drugs that had been fitted up in one corner of the large Museum. All necessary apparatus for blood pressure experiments were shown, including the lately devised Pittenger Multiple Operating Table and Kymograph Case, which is capable of accommodating four dogs at one time for testing purposes. The

apparatus used in standardizing pituitary extract by the isolated uterus method was also on view. A number of carefully prepared charts had been suspended in conspicuous places to illustrate the necessity for physiological assays and the methods of carrying them out.

One chart showed the results of an investigation of the digitalis preparations on the market, the variation in strength ranging from 1 to 300 per cent. of normal, thus emphasizing the necessity of fixing and maintaining standards, so as to insure uniformity of action of drugs. In view of the fact that the new Pharmacopœia has recommended biological assays for a number of drugs and requires that cannabis be standardized by physiological methods, this display was particularly interesting and timely.

Some of Burroughs-Wellcome Company's scientific literature and preparations gotten up in a most attractive form were on view and their exhibit was the only one consisting of pharmaceutical products manufactured in England. Both Burroughs and Wellcome graduated from the Philadelphia College of Pharmacy and later went to England where they have since built up a large manufacturing business.

The progress of chemistry, particularly as it relates to pharmacy was in a measure depicted by the displays of Powers, Weightman, Rosengarten Co.; Keasby and Mattison and A. Klipstein & Co.

Chemical Manufacturers' Exhibits.

Powers, Weightman and Rosengarten have been well known for nearly a century as manufacturers of high-class chemicals for medicinal and technical use. They inaugurated a novel departure from the usual type of exhibit by showing not only finished chemicals but the crude materials from which they are made. For example, there were samples of gum opium and morphine and codeine derived therefrom. There were samples of cinchona bark and its alkaloid quinine; nutgalls and tannic acid; magnesite and heavy magnesium oxide; iodine (crude) and iodine resublimed, etc.

Powers & Weightman and Rosengarten & Sons, the two firms which later united to form the present company of Powers, Weightman & Rosengarten, introduced into this country the manufacture of quinine and morphine sulphates, and this firm to-day is one of the largest makers of these products in the world. Not less important

is the relation of this company to the manufacture of many other staple chemicals, such for example as citric acid, bismuth subnitrate, strychnine and ether for anæsthesia, samples of which were also included in the display. A comprehensive list of other medicinal and technical chemicals are also manufactured by this firm as shown by their catalogue at the exhibit.

The collection of magnesia products displayed by Keasby and Mattison of Ambler, Pa., was also very interesting. Their magma magnesium oxide for the quick preparation of milk of magnesia was shown as were also numerous forms of asbestos for which this firm is particularly well known. Hynson, Westcott and Dunning had some of their specialties on exhibition and Dodge & Olcott had a display of volatile oils in the various types of containers used in commerce. A huge block of sandalwood on the table with these oils was viewed with interest by the many visitors.

Miscellaneous Supplies and Those Who Furnished Them.

While mentioning the various exhibitors of manufactured products it is well to call attention to the other concerns who helped to make this exhibit a success. In the equipment of the model pharmacy the telephone booth was loaned by the Bell Telephone Co. The mahogany fixtures were provided by Smith, Kline & French Company. The merchandise in the store was loaned by George B. Evans, while the office fixtures were obtained for the occasion from A. Pomerantz Company. The Burroughs Adding Machine Company furnished the adding machine for the office and L. C. Smith Brothers Typewriter Company loaned the combination label and letter machine.

Arthur H. Thomas provided the chemical, bacteriological and other scientific apparatus for equipping the analytical laboratory and most of the pharmaceutical glassware and shop furniture was loaned by Whitall-Tatum Company. Prescription balances and scales were furnished by Henry Troemner and the Torsion Balance Company. The F. J. Stokes Machine Company loaned a hand tablet machine and an automatic water still. Wrapping paper was obtained from D. L. Ward Company, and the United Gas Improvement Company provided the store with modern gas lighting fixtures.

It is a difficult matter to describe an exhibit covering as great a field as this one included, in limited space and do full justice to each

individual portion of it. Our object has been to give a general survey, calling particular attention to some of the outstanding features.

We could say considerably more without touching, perhaps, on some particular phases of the exhibit which may have appealed most strongly to some visitors and yet we dare say that some of the things here described were not noticed by many of those who saw the exhibit. All of which merely goes to show that in order to fully appreciate an exhibition of this kind, from the personal standpoint, it must be seen. The writer was fortunate in securing the coöperation of his faculty colleagues, when he was asked to prepare this account. He is indebted to Prof. LaWall for the detailed account of the Glentworth store and other data. Professors Kraemer, Cook, Lowe, Moerk and Stroup pointed out the particular features which had been emphasized in connection with the exhibits of their respective departments, and President Howard B. French furnished some interesting details particularly with regard to the Glentworth store. The committees on exhibit of the Board of Trustees and Alumni Association cannot be too highly commended for their splendid work.

Committee.

The original committee on the 50th Anniversary Celebration of the Alumni Association of the Philadelphia College of Pharmacy consisted of a joint committee of the Board of Trustees and the Alumni Association. The committee of the Board of Trustees consisted of President Howard B. French, Chairman; Mr. W. L. Cliffe, Professor Joseph P. Remington, Mr. Walter A. Rumsey, and Mr. Joseph W. England. The committee of the Alumni Association was made up of Professor Henry Kraemer, Chairman; Professor F. P. Stroup, Mr. Warren H. Poley, Mr. Otto Kraus, and Dr. Mitchell Bernstein. The membership of the joint committee was increased by the addition of the following: Professor E. Fullerton Cook, Mr. C. Mahlon Kline, Mr. James A. Garvey, Mr. John R. Graham, Professor Charles H. LaWall, Mr. Ivor Griffith, Mr. George B. Evans, Mr. Walter V. Smith, Hon. Theodore Campbell, Mr. Charles Rehfuss, and Dr. P. Samuel Stout. The work was subsequently divided into two principal committees, the one on Exhibition of which Professor E. Fullerton Cook was Chairman, and the other on Dinner of which Mr. Otto Kraus was Chairman.

That this exhibit will go down in the history of the Philadelphia College Alumni Association as one of its greatest achievements is certain, and in the years to come it will be referred to as having commemorated three things: First, the fiftieth anniversary of the Alumni Association; secondly, the beginning of a new era in the practice of pharmacy, and thirdly, the beginning of a greater Philadelphia College of Pharmacy as a result of the enlarged faculty, student body and alumni association, due to the recent merger with the department of pharmacy of the Medico-Chirurgical College.

The same spirit of altruism and fair play which prompted President French and the Board of Trustees of the College to receive the faculty and student body of the pharmacy school of the Medico-Chirurgical College with open arms, has brought about a merger of the two alumni associations. And the Alumni Association of the Philadelphia College of Pharmacy thus fortified enters its second half century with supreme confidence in its own future, the future of pharmacy and the future of its Alma Mater.

SOME CONSTITUENTS OF SUMBUL ROOT.[1]

By Frederick W. Heyl and Merrill C. Hart.

Since the root of *Ferula Sumbul* is an officially recognized drug of the United States Pharmacopœia, and has for some years been used as an antispasmodic, it was deemed of interest to subject the root to a more complete chemical investigation. Our present knowledge of its constituents is fairly summarized in the United States Dispensatory,[2] where it is stated that the root contains a volatile oil, two balsamic resins, wax, gum, starch, a bitter substance, fat (17 per cent.), angelic and valeric acids. Knitl,[3] with Tschirch, isolated umbelliferon. Cushny [4] classifies sumbul with valerian, basing the similarity upon the presence of malodorous volatile oils, which may act psychically and physiologically. Since the oil of sumbul, in consequence of the study of the other constituents reported in this paper, appears to be important in this connection, we shall report upon it later.

[1] Reprinted from the *Journal of the American Chemical Society*, vol. xxxviii, No. 2, February, 1916.

[2] U. S. Dispensatory, 19th Ed., 1209.

[3] *Archiv. Pharm.*, **237**, 270 (1899).

[4] "Pharmacology and Therapeutics," 73 (1906).

It is generally stated that the musk root now upon the pharmaceutical market in the United States is not true *Ferula Sumbul;* but that in its place we have the dried rhizome and root of an undetermined umbelliferous plant, which enters commerce from Central and Northern Asia, through the Moscow drug market. Our sample consisted of the unsliced root imported from Moscow. Further than this it was impossible to trace its origin. The root was of a quality which is now considered official.

The proximate analysis shows that the air-dried root contained 10.2 per cent. moisture and 6.5 per cent. ash. Ligroin extracted, 11.8 per cent.; ether, 14.6 per cent.; and alcohol, 27.4 per cent. The residue insoluble in alcohol had the following composition: crude fibre, 17.5 per cent.; pentosans, 10.6 per cent.; protein, 5.4 per cent.; starch, 7.7 per cent.; dextrin, 1.4 per cent. The alcoholic extract, which contains the substances entering into pharmaceutical preparations, showed the presence of 1.7 per cent. sucrose, approximately 1.0 per cent. lævulose, and the resin after hot extraction amounts to 18.7 per cent. There is a very considerable discrepancy in the extractive matter removed by alcohol, depending upon the temperature. Whereas boiling 95 per cent. alcohol extracted 27.4 per cent. of sumbul root, the cold percolation, which was exhaustively completed, extracted only about 20 per cent., and about 17.3 per cent. was precipitated by the addition of water.

The products present in the alcoholic solution (obtained by cold percolation) and soluble in water, besides the sugars above mentioned, are acetic acid, a glucoside of umbelliferon, and betaine.

The resin insoluble in water, which forms the most conspicuous portion of this drug, was extracted successively with ligroin, ether, chloroform, ethyl acetate, and alcohol.

The ligroin extract consisted to the extent of about 17 per cent. of resinous material other than fat. This product was a white acid resin, soluble in one per cent. potassium hydroxide, and yielded upon hydrolysis vanillic acid and an oil resembling the volatile oil. The fat yielded a large amount of indefinite unsaponifiable material, of which one fraction showed a constant boiling point at 168–173° at 12 mm. and upon analysis gave values indicating the formula $C_8H_{13}O$. The unsaponifiable matter further yielded a phytosterol, $C_{27}H_{46}O$, melting at 134–135°. The corresponding acetate melts at 121–122°. The following fatty acids were identified: acetic, butyric, valerianic, tiglic, angelic, oleic, linoleic, cerotic, palmitic and stearic acids.

The ether extract of the resin yielded a phytosterolin, $C_{33}H_{56}O_6$, melting at 290°. It formed an acetate that melted at 159–160°. A trace of vanillin was indicated by color tests. The ether extract consists of neutral resinous (42 per cent.) and acidic resinous (52 per cent.) constituents. The former proved to be an ester, and yielded umbelliferon and therefore belongs with the group that includes galbanum, sagapen and asafœtida. The acidic resin could be prepared as an almost white powder, but fractional extraction indicated this to be a mixture of resin acids. These acids upon hydrolysis yield both vanillic acid and umbelliferon.

The chloroform extract of the resin consisted largely of a resinous glucosidic substance. It yielded umbelliferon and glucose upon hydrolysis.

The product extracted from the resin with ethyl acetate was not glucosidic but umbelliferon was prepared from it after hydrolysis.

The alcoholic extract of the resin also yielded umbelliferon and a reducing sugar upon hydrolysis.

Experimental.

A. Proximate Analysis (By Mr. J. F. Staley).—A sample of the air-dried root after grinding and sieving was quantitatively extracted with various solvents and the following results were obtained:

Extract	Per cent.
Ligroin (35–55°)	11.72, 11.83
Ether (110°)	14.66, 14.55
Volatile ether extract	(see below, volatile oil)
Alcoholic	27.6, 27.14

The proximate analyses were conducted in accordance with the usual methods [5] and gave the results tabulated below:

	Per cent.		Per cent.
Moisture	10.17	Protein	5.5, 5.3
Starch (diastase)	7.7	Ash	6.5, 6.4
Pentosans	10.6	Dextrin	1.4
Crude fibre	17.15, 17.6		

A determination of the alcohol soluble carbohydrates was carried out by completely extracting 100 g. of the root with boiling neutral alcohol. The combined alcoholic extracts were concentrated under

[5] U. S. Dept. Arg., Bur. of Chem., Bul. 107 (revised).

diminished pressure to a small volume, and enough water was added to completely precipitate the resin. This mixture was shaken repeatedly with ether in the volumetric flask, in order to remove as much of the resin as possible. The ether was removed with a pipet. The last traces of ether were removed by passing a current of air through the solution, which was thereupon precipitated with an excess of basic lead acetate solution and made up to a volume of 200 Cc. This solution was filtered and the filtrate showed a rotation of –1.78° V, at 20° in a 2 dcm. tube. Lead was removed from the solution and 12.5 Cc. were inverted by permitting it to stand in the presence of hydrochloric acid for 24 hours. The solution was neutralized and made up to a volume of 50 Cc. This showed a rotation of –0.6° in a 2 dcm. tube. The percentage of sucrose calculated by Clerget's formula is 1.64 per cent. It is further indicated that the reducing sugar is lævulose in an amount of approximately 0.51 per cent. Gravimetric estimation of the sugars by the Munson and Walker modification of Fehling's process gave 1.87 per cent. sucrose and 1.0 per cent of reducing sugar.

Sumbul root was examined for the presence of alkaloids by extracting a 200 g. sample with Prolius's solution but with negative results.

Volatile oil was determined, first by steam distilling one kilo of the coarsely ground drug for a few hours. The yield was 6.8 g. oil corresponding to 0.68 per cent. When a 500 g. sample of finely sieved material was distilled for several days 5.51 g. of oil (1.1 per cent.) was obtained.

The oil on standing deposited a few yellow crystals that melted at 113–114° but these were not identified. The oil had a specific gravity of 0.932 at 15°. Upon distillation the higher fractions turned dark blue in color. A qualitative test for sulphur was negative.

B. Complete Examination of Alcoholic Extract.—For this purpose 56.7 kg. were exhausted by percolation with cold 95 per cent. alcohol. The percolate (327 l.) was concentrated under diminished pressure to a volume of 15.7 litres (1 l. = 3.6 kg. sumbul root).

Two litres of this extract were poured into 8 litres of distilled water and vigorously shaken. A heavy, sticky, viscous, light brown, semi-liquid separated. After standing 24 hours the aqueous layer was decanted, and the resin was washed with a second addition of distilled water. The resin weighed 1231 g. = 17.1 per cent. A second 2-litre portion gave 1251 g. A third lot was precipitated and

the resin fraction on the one hand, and the fraction representing the water-soluble constituents on the other, were studied separately.

The Examination of the Water-Soluble Constituents.—This solution (30 litres) contained the water-soluble constituents from 6 litres of the alcoholic extract representing 21.6 kg. of the root. It contained 520 g. of material and was concentrated to a volume of 3 litres under reduced pressure. The distillate obtained was distinctly acid. It was therefore rendered alkaline with barium hydroxide and concentrated to a small volume, again rendered acid and steam distilled. Acetic acid was identified as the silver salt.

Calc. for $C_2H_3O_2Ag$: Ag=64.6. Found: 64.1 per cent.

The concentrated solution was extracted repeatedly with large volumes of ether. The ethereal solution, which contained 46 g. of material, was concentrated to a small volume and fractionally extracted with solutions of hydrochloric acid (10 per cent.), water, ammonium carbonate, sodium carbonate, and potassium hydroxide successively. Nothing definite was isolated from these fractions, although the sodium carbonate fraction upon acidification yielded slight amounts of crystalline material.

The aqueous solution, which had been completely extracted, was extracted with chloroform, which removed 13 g. of dark, oily material, from which nothing of a crystalline nature could be obtained. The aqueous layer, after the above-mentioned ether and chloroform extractions, was repeatedly shaken with hot amyl alcohol. The combined amyl alcoholic extracts were concentrated and washed repeatedly with water until free from reducing sugar. Upon further concentration of the amyl alcoholic extracts several crops of brown amorphous hygroscopic material separated. These could not be crystallized. The amyl alcohol was completely removed. Altogether 122 g. of material were present in this fraction, but its dark-colored, varnish-like nature prevented crystallization even after prolonged standing. For acid hydrolysis 42 g. were digested for two hours with 5 per cent. dilute alcoholic sulphuric acid. Upon removal of the alcohol, a smear separated. Water was added and the whole subjected to a steam distillation. The oily distillate which had an odor resembling furfuraldehyde failed to give the furfuraldehyde test. When the contents of the flask which had been steam-distilled had cooled a black resin separated, in which were admixed wart-like aggregates of crystalline material. The resin was therefore repeat-

edly extracted with boiling water. This was facilitated by blowing steam through the mixture. Altogether 2.9 g. of crystalline material separated from these watery extractions. The product was crystallized from dilute alcohol and from hot water. It separated in beautiful star-like aggregates of fine needles, melting at 227°. These crystals gave a blue fluorescence in alkaline solution. They were identified as umbelliferon.

Calc. for $C_9H_6O_3$: C, 66.67; H, 3.7. Found: C, 66.63; H, 3.9.

The black resin was dissolved in alcohol, poured upon purified sawdust and extracted with various solvents, but no crystalline compounds were isolated from it.

The combined acid aqueous liquid, from which umbelliferon had crystallized, was concentrated to a small volume and extracted with ether, which dissolved a further quantity of umbelliferon. The sulphuric acid was quantitatively removed from the aqueous solution, from which *d*-phenyl glucosazone melting at 204–205° was prepared. No pentose sugar was present. The quantity of reducing sugar present was equivalent to 11.27 g. glucose.

One of the products extracted by amyl alcohol is therefore distinctly shown to be glucosidic in nature, and is undoubtedly a body similar to or isomeric with the glucoside of *Skimmia japonica*.[6]

The aqueous liquid which had been extracted with ether and with amyl alcohol was freed from the latter immiscible solvent by means of a vigorous steam distillation. The total volume at this point was 10 litres.

The distribution of nitrogen in this solution was as follows: Total soluble nitrogen, 3.8 g. or 0.017 per cent.; ammonia nitrogen, 1.23 g. or 0.0057 per cent.; lead subacetate precipitable nitrogen, 1.31 g. or 0.0068 per cent.; nitrogen precipitated with phosphotungstic acid, 0.463 g. or 0.0021 per cent.

In order to test for acid amides such as asparagine and glutamine, one-fifth of the solution was precipitated with mercuric acetate solution, but only a very slight separation took place. Its subsequent examinations for asparagine, glutamine, and allantoine were negative.

The remaining four-fifths was completely precipitated with basic lead acetate, whereupon a precipitate separated. This was removed by filtration and decomposed with hydrogen sulphide in the usual

[6] Eykman, *Receul trav. chim. pays-bas.*, 1884, p. 204.

manner. The material precipitated with lead subacetate weighed but six grammes. The usual tests for tannin were negative. It was mixed with purified sawdust and extracted with various solvents but this led to no pure products. An alkaline hydrolysis yielded no definite compounds.

The filtrate from the lead subacetate precipitate was freed from the excess of lead with hydrogen sulphide and after filtering off the lead sulphide, the filtrate was concentrated to a syrup. A small portion of this syrup, which has been shown to contain lævulose and sucrose, yielded a heavy crystalline deposit of pure *d*-phenylglucosazone which melted and decomposed at 210–211°. Pentose sugars were absent.

The remainder of this solution was precipitated with an excess of phosphotungstic acid in the presence of 5 per cent. sulphuric acid, and the resulting precipitate was removed by filtration, washed with 5 per cent. phosphotungstic acid wash and decomposed by the method of Wechsler.[7]

The solution of the basic products was made up to a volume of 500 Cc.

25 Cc. distilled with MgO yielded no ammonia.
25 Cc. required by the Kjeldahl method 12.58 Cc. 0.1 *N* acid.

The remainder of the solution of basic products was concentrated to a syrup at 33°. This was extracted with 150 Cc. of absolute alcohol and filtered. The alcohol was removed, and upon again treating the residue with absolute alcohol an amorphous hygroscopic solid separated. The filtrate from this now proved to be freely soluble in absolute alcohol and upon the addition of concentrated hydrochloric acid crystals consisting chiefly of betaine hydrochloride separated. The yield amounted to 0.5 g. or 0.019 per cent. These crystals were not quite homogeneous. After several crystallizations from alcohol the melting point was about 229–232°. Some parts of the crystalline mass which had the typical appearance of betaine hydrochloride could be picked out, and after rinsing with absolute alcohol the melting point found was 235°. The chlorine determination also indicated the presence of another base.

Calc. for $C_5H_{11}O_2N.HCl$: Cl, 23.1 per cent. Found: Cl, 24.5 per cent.

Pure betaine was identified after a fractional crystallization as the gold salt.

Calc. for $C_5H_{12}O_2N.AuCl_4$: Au, 43.1 per cent. Found: Au, 43.2 per cent.

[7] *Z physiol. Chem.*, 73, 138 (1911).

Cholin was absent. A fractional crystallization of the mercuric chlorides failed to indicate any separations. The most insoluble fraction of the mercuri-chlorides when decomposed with hydrogen sulphide, and converted into the corresponding gold salt, yielded a very pure sample of betaine aurichloride melting at 246–247° and containing 43.1 per cent. gold. The melting point of the following fraction was 239–240° and it contained 42.7 per cent. gold. The base here is chiefly betaine, but another substance is also present in the fraction.

The Examination of the Resin.—The resin precipitated when the alcoholic extract was poured into water weighed about 3.7 kg. This in alcoholic solution was poured upon purified sawdust, after it had been ascertained that nothing crystalline could be directly separated from it. A suitable quantity of the dried impregnated sawdust was transferred to a continuous extractor and extracted with the following results:

Petroleum ether (40–60°)	357 g.
Ether	316
Chloroform	46
Ethyl acetate	19
Alcohol	18
Total	756 g.

The Ligroin Extract.—This extract amounted to 357 g. It was dissolved in 2 litres of ether and then extracted with solutions of hydrochloric acid, water, and ammonium carbonate. None of these extractions yielded definite products. The ethereal solution was now shaken with a solution of potassium carbonate, whereupon an emulsion formed. The mixture was acidified and then a clear ethereal solution was recovered which was successfully extracted with a ten per cent. solution of potassium hydroxide. The combined potassium hydroxide extractions were acidified and extracted with ether, and from this ethereal solution the substances soluble in aqueous potassium carbonate solution could now be extracted, leaving at length an ethereal solution containing 62 g. The constituents of the ether solution which were soluble in potassium carbonate solution were again extracted with ether after acidifying the solution of the potassium salts. The solution was dried over anhydrous sodium sulphate and the ether removed. The residue, which weighed 32 g., was distilled under diminished pressure. The boiling point was 234–275° at 28 mm. and it had an iodine number of 101.3. These fatty acids

were studied in connection with those obtained upon the subsequent hydrolysis of the glycerides.

The material soluble in potassium hydroxide solution was almost entirely removed from its ether solution by fractional extraction with one per cent. potassium hydroxide solution. Upon acidification this resin could be obtained as a brittle solid. It yielded the same products when hydrolyzed in acid and in alkaline alcoholic solution. The acid hydrolysis, however, was more satisfactory, and after heating for many hours with 5 per cent. alcoholic sulphuric acid the alcohol was removed by steam distillation.

The steam distillate yielded a small quantity of an oil resembling the volatile oil of sumbul. The fraction boiling below 230° was colorless while the fraction boiling at 230–250° was dark blue in color.

The black resinous hydrolysis products contained in the flask were extracted with ether. The ether was extracted with solutions of ammonium carbonate, potassium carbonate, and potassium hydroxide. From the ammonium carbonate extract, vanillic acid was obtained. It melted at 206.5 to 207.5°. It was dried at 125° and analyzed.

Calc. for $C_8H_8O_4$: C, 57.1; H, 4.8. Found: C, 57.1; H, 4.7.

The methyl ester, prepared in the usual manner, melted at 62–63°.

The potassium carbonate extraction showed a blue fluorescence, but nothing could be obtained from it. The potassium hydroxide solution removed most of the hydrolytic products. These were recovered and again hydrolyzed with a further quantity of 5 per cent. alcoholic sulphuric acid, but no further yield of vanillic acid was obtained. The material soluble in potassium hydroxide solution was fractionally distilled at a pressure of 17 mm. Five fractions were obtained: (I) up to 150°, (II) 150–170°, (III) 170–205°, (IV) 205–212°, (V) above 212°. Fractions I, II, III were solids from which a considerable quantity of vanillic acid (206–207°) was isolated. The upper fractions were amber-colored oils that solidified. They resemble somewhat the higher boiling fractions obtained in the unsaponifiable fraction of the fat.

The original ethereal solution which had been extracted as described above was evaporated to dryness and the residue of neutral substances was saponified by boiling with 700 Cc. of ten per cent. alcoholic potash for about seven hours. The alcohol was removed and water added in sufficient quantity to completely precipitate the unsaponifiable material. This was extracted with ether.

Examination of the Unsaponifiable Matter.—The dried solution was evaporated to dryness and the residue proved to be an oil which could not be directly crystallized. The material was divided into two equal parts and fractionally distilled under diminished pressure. The results upon the first half were as follows:

Fraction I. (B. p. 100–174° at 27–24 mm.) This was a yellowish limpid oil with a somewhat fragrant odor and amounted to about 7 g.

Fraction II. (B. p. 174–190° at 25 mm.) This is an olive-green oil amounting to about 11 g. The viscosity seemed to increase noticeably and the fraction was therefore stopped at 190°.

Fraction III. (B. p. 190–205° at 28 mm.) This was a thick olive-green oil amounting to about 14 g.

Fraction IV. (Up to 267° at 30 mm.) This is a thick viscid fraction which did not solidify and weighed about 23 g.

Fraction V. (B. p. 290–360° at 17 mm.) This weighed 4.4 g and partially solidified.

The other half of the unsaponifiable material was distilled in approximately the same manner and the light, limpid fragrant oils which constitute the lower boiling fractions were fractionally distilled several times.

The fractions were as follows:

Fraction I. (Up to 140° at 15 mm.) This fraction had no sharp boiling point, as some of the material boiled at 80°. It is a very mobile yellow oil.

0.1807 g. absorbed 0.301 g. iodine; iodine number, 166.6. 0.1902 g. subst. gave 0.1815 g. H_2O and 0.5564 g. CO_2. Found: C = 79.8; H = 10.7.

Fraction II. (B. p. 140–170° at 18 mm.) This is a yellow oil, slightly less mobile than Fraction I. It was rather fragrant and was unsaturated.

Fraction III. (B. p. 175–180° at 15 mm.) This fraction appeared to possess an almost constant boiling point. It was redistilled and most of it passed over at 168–173° at 12 mm. It was light green in color and not more than slightly mobile unless warmed. The specific gravity at 15° was 1.0052 and $[\alpha]_D$ was −17.41°.

2.3353 g. made up to 20 Cc. with chloroform showed a rotation of −4.06° in a 2 dcm. tube.

0.1393 g. subst. absorbed 0.2432 g. iodine; iodine number, 174.6. 0.1982 g. subst. gave 0.1482 g. H_2O and 0.5596 g. CO_2. Calc. for $C_8H_{12}O$: C = 76.75; H = 10.5. Found: C = 77.0; H = 10.4.

The other fractions boiling above 180° and below 270° were thick viscid oils and seemed similar to the material which usually accompanies the phytosterols in this fraction, but the amount present in sumbul root is unusually large. It amounted to about one-half of the entire fraction.

The highest boiling fraction yielded, when crystallized from ethyl-acetate, 2.0 g. of a phytosterol melting at 134–135°.

Calc. for $C_{27}H_{46}O.H_2O$: $H_2O = 4.5$. Found: 4.97.
Calc. for $C_{27}H_{46}O$: $C = 83.9$; $H = 11.9$. Found: $C = 84.0$; $H = 12.1$.

0.4786 g. anhydrous material made up to 20 Cc. with chloroform showed a rotation of 1.42° in a 2 dcm. tube, whence $[\alpha]_D^{20} = -29.7°$.

It yielded an acetyl derivative, that separated from acetic anhydride in thin, elongated plates terminating in an angle at one end, and melting at 121–122°. When recrystallized from ethyl acetate the melting point was unchanged. The filtrate from which this 2 g. of phytosterol separated yielded upon concentration 1.3 g. further. Recrystallized once it melted at 133–134° and yielded an acetate identical in appearance with the one just described. The melting point of the acetate separating from acetic anhydride was 118–120° which was elevated to 120–121° by one recrystallization.

Examination of the Volatile Fatty Acids.—The alkaline solution from which the unsaponifiable matter had been extracted with ether was divided into two equal parts, each of which, after acidification with dilute sulphuric acid, was steam distilled for eight hours. The odor of the distillate resembles that of infusion of hops. The combined distillate was almost neutralized with 656 Cc. of 0.41 *N*, barium hydroxide solution. This was concentrated under diminished pressure to a volume of 200 Cc. and acidified with hydrochloric acid, whereupon a quantity of oil separated which was extracted with ether. The solution was dried over anhydrous sodium sulphate and the ether removed. The residue, weighing about 17 g. was fractionally distilled at atmospheric pressure. The distillate was caught in three fractions: (I) up to 157°; (II) 157–190° (62.2 g.); (III) 190–200° (9.5 g.). The third fraction, when allowed to stand in the ice chest, yielded a crop of beautiful crystals of tiglic acid melting at 61°. The fractions above recorded were now subjected to a systematic fractional distillation and five fractions were obtained.

Fraction I. (B. p. up to 125°.) This fraction was neutralized with ammonium hydroxide, concentrated in order to remove the

excess of ammonia and treated with silver nitrate solution. It contained a small quantity of acetic acid as was shown by the analysis of the silver salt that separated.

0.1171 g. gave 0.0717 g. silver. Calc. for $C_2H_3O_2Ag$: Ag = 64.6 per cent. Found: 61.2 per cent.

Fraction II. (B. p. 125–165°.) This was an intermediate fraction, amounting to about 3 g. It had the odor of acetic acid combined with that of valerianic or butyric acid.

0.1331 g. gave 0.1050 g. H_2O and 0.2377 g. CO_2. Found: C = 48.7; H = 8.85. Calc. for $C_2H_4O_2$: C = 40.0; H = 6.7 per cent.; for $C_4H_8O_2$: C = 54.5; H = 9.1 per cent.; for $C_5H_{10}O_2$: C = 58.8; H = 9.8 per cent.; for $C_5H_8O_2$: C = 60.0; H = 8.0 per cent.

The analytical data indicates a mixture of butyric and acetic acids.

Fraction III. (B. p. 165–180°.) This fraction had the odor of butyric and valerianic acids. When dissolved in aqueous solution of sodium carbonate it instantly reduced potassium permanganate solution in the cold and it therefore contained a quantity of unsaturated acid.

0.2152 g. gave 0.1549 g. H_2O, and 0.4308 g. CO_2. C = 54.6; H = 8.1.

This fraction consists essentially of butyric and angelic acids.

Fraction IV. (B. p. 180–190°.) C = 59.7; H = 8.33. This fraction was converted into the silver salts which had a constant composition.

Calc. for $C_4H_7O_2Ag$: Ag = 55.4; for $C_5H_9O_2Ag$: Ag = 51.7; for $C_5H_7O_2Ag$: Ag = 52.2. Found: I, Ag = 52.1; II, Ag = 52.0.

Fraction V. (B. p. 190–195°.) C = 59.8; H = 8.1.

These fractions are mixtures of angelic and tiglic acids. The solid acid, which was repeatedly separated by freezing the high boiling fraction, melted at 62–63°, and when analyzed gave results agreeing with those required by tiglic acid.

Calc. for $C_5H_8O_2$: C = 60.0; H = 8.0. Found: C = 60.1, H = 8.1.

The aqueous liquid from which the above-described acids had been extracted with ether was again steam distilled and yielded a crop of crystals of almost pure silver acetate.

Calc. for $C_2H_3O_2Ag$: Ag = 64.6. Found: Ag = 64.1 per cent.

Examination of the Non-volatile Fatty Acids.—The acid mixture which had been steam distilled for the removal of the fatty

acids was cooled and extracted with ether. From the dried solution the ether was removed and the residue digested with a large volume of low boiling petroleum ether. A considerable quantity of a sticky, brown smear proved to be insoluble. The petroleum ether was removed and the fatty acids distilled. They had an iodine number of 121, and boiled chiefly at 230–260° at 15 mm. However, a considerable quantity came over at lower temperatures, showing that the steam distillation had not completely removed the lower acids. The first distillate crystallized upon cooling and proved to be tiglic acid melting at 63–64°. Furthermore, a fraction boiling above 260° was caught. The weight of these acids was 19.2 g.

This was mixed with the acids which had been originally extracted with potassium carbonate solution. Of this mixture a portion weighing 22.4 g. was separated into the solid and liquid acids. The latter weighed 16 g., thus constituting about 71 per cent. of the fatty acids. These boiled chiefly at 215–245° at 15 mm., although they seemed to contain a trace of the lower acids.

Calc. for $C_{18}H_{34}O_2$: C = 76.6; H = 12.1; iodine no. = 90.1; for $C_{18}H_{32}O_2$: C = 77.1; H = 11.4; iodine no. = 181.4; for $C_{18}H_{30}O_2$: C = 77.7; H = 10.8; iodine no. = 274.0. Found: C = 77.3; H = 11.2; iodine no. = 138.7.

The liquid acids therefore consist of oleic and linoleic acids with perhaps a small quantity of tiglic acid.

The solid acids weighed 4.1 g. A quantity of cerotic acid equivalent to 33 per cent. of the solid acids was obtained. It melted at 74–75°.

Calc. for $C_{26}H_{52}O_2$: C = 78.8; H = 13.1; N. V. = 141.7. Found: C = 78.4; H = 13.0. N. V. = 140.7.

The alcoholic filtrate from the cerotic acid yielded a quantity of a mixture of palmitic and stearic acids melting at 52–53°.

Calc. for $C_{16}H_{32}O_2$: C = 75.0; H = 12.5; N. V. = 219.1; for $C_{17}H_{36}O_2$: C = 76.1; H = 12.7; N. V. = 197.5. Found: C = 75.6; H = 12.5; N. V. = 205.3.

The Ether Extract of the Resin, which amounted to 316 g., was obtained in two extractions of the sawdust which had been impregnated with the resin, as above described. The first extract amounting to 300 g. was very soluble, while the second ether extract (16 g.) was obtained by prolonged extraction and upon standing tended to separate as a tar.

The first extract was concentrated and after prolonged standing a small quantity of a white micro-crystalline product separated. When this substance was dissolved in chloroform, in the presence of a few drops of acetic anhydride, and sulphuric acid was added a play of colors resulted showing at first transient pink, then blue, and finally a beautiful green. It melted at 260–270°, and after crystallization from dilute pyridine it melted at about 290°. It was a phytosterolin.

Calc. for $C_{28}H_{46}O_3$: C = 72.3; H = 10.2. Found: C = 72.6; H = 10.2.

A small portion was converted into an acetate, which crystallized from a mixture of dilute alcohol and ethyl acetate in beautiful plates, melted at 59–160°.

A portion of the ethereal filtrate from the above-mentioned phytosterolin was shaken with a 30 per cent. sodium bisulphite solution. The aqueous solution was drawn off, acidified with H_2SO_4 and allowed to stand until the sulphur dioxide had been dissipated. The solution now had an aromatic fragrance. It was extracted with ether. The ether solution showed a residue of an insignificant amount of oil. This was subjected to the color tests characteristic for vanillin. With ferric chloride a green color resulted, similar to the color resulting with dilute vanillin solutions. The phloroglucin and hydrochloric acid test showed a light pink coloration. It is therefore quite probable that this resin contains a trace of vanillin.

A quantity of this resin (277 g.) was dissolved in ether and extracted successively with water, and with solutions of ammonium carbonate, potassium carbonate, and potassium hydroxide. The ether was then washed with water and the solvent removed. This *neutral constituent* weighed 116 g. or 42 per cent. of the ether extract. It is an extremely sticky substance and when warmed can be pulled into shiny, silken-like threads. It is very soluble in alcohol. In order to find out whether it was ester like, corresponding to the "resinotannolester" group of Tschirch, or a stable substance incapable of hydrolysis ("resene") estimations were carried out upon its saponification value.

1.898 g. boiled 0.5 hr. with 23 Cc. 0.5 *N* KOH (alcoholic) neutralized 0.3136 g. KOH. S. V. = .165.

1.898 g. boiled 1.0 hr. neutralized 0.333 g. KOH. S. V. = 175.5.

1.898 g. boiled 5 hrs. neutralized 0.3416 g. KOH. S. V. = 179.

It appeared, therefore, that some insight into the composition of

this amorphous resin might be gained by hydrolysis. For this purpose 35.5 g. were dissolved as far as possible in 350 Cc. of 10 per cent. KOH, and steam was passed through the mixture for about one week. The liquid when acidified gave an oily precipitate, and the acid filtrate was examined for organic acids with negative results. Saponification with 20 per cent. KOH solution for a somewhat longer period gave no smooth reaction, although small quantities of volatile acids were detected as decomposition products.

Another portion (33 g.) was hydrolyzed by the method of Tschirch,[8] using at first sulphuric acid 1 : 2. After distilling with steam for 4 days, 0.915 g. of umbelliferon was obtained. The strength of the sulphuric acid was increased to 1 : 1 and after about ten days 3.86 g. further of umbelliferon was obtained. The total umbelliferon corresponds to 14.3 per cent. of the neutral portion. It gave the characteristic fluorescence with alkalies, and after recrystallizations from water, dilute alcohol, and ethyl acetate melted at 228°.

Calc. for $C_9H_6O_3$: C = 66.67, H = 3.7. Found: C = 66.86, H = 3.43.

The resin or ester is therefore somewhat similar to some other resins of the umbelliferæ such as galbanum, sagapen, asafœtida, which yield umbelliferon when thus hydrolyzed.

The ammonium carbonate extract of the ether extract of the resin was acidified and permitted to stand for some time when a quantity of tar separated. This was removed by filtration and the clear aqueous acid filtrate thoroughly extracted with ether. This solution was evaporated to dryness and dried *in vacuo* over sulphuric acid. When now it was digested with small volumes of anhydrous ether a white crystalline deposit remained, weighing 0.24 g. It was crystallized from water, whereupon it melted at 205–206°. It was dried for 2.5 hours at 125° and analyzed. The remainder was again recrystallized from dilute alcohol, whereupon it separated in needles and the melting point remained constant. This was dried at 115° and also analyzed.

I. 0.0853 g. subst. gave 0.1802 g. CO_2 and 0.0357 g. H_2O. II. 0.0641 g. subst. gave 0.1351 g. CO_2 and 0.0270 g. H_2O.

Calc. for $C_9H_{10}O_4$; C = 57.1; H = 4.8. Found: C = 57.61; H = 4.69, 4.73.

This acid appears to be vanillic acid (3-methoxy protocatechuic

[8] "Die Harze und die Harzbehälter," 1906, p. 342.

acid). This was further substantiated by the determination of the methoxyl group upon another small sample.

The potassium carbonate extract of the ether extract upon acidification yielded a tar which was removed by filtration. From the filtrate about 0.2 g. of umbelliferon was isolated. Recrystallized from hot water it melted at 226° and when a mixture of this product with the umbelliferon that was obtained from the glucoside by hydrolysis was melted, the melting point was 227°.

Calc. for $C_9H_6O_3$: C = 66.67; H = 3.7. Found: C = 66.9; H = 3.7.

When the potassium hydroxide extract was redissolved in alcohol it was impossible to obtain crystalline products even after the solution was stood aside for months. Thus the resinous extract weighed 143 g., equivalent to 52 per cent. of the ether extract. It showed no ester properties, and was in fact a resin acid. (Acid no. = 129.) A portion (106 g.) was dissolved in a large volume of ether and again extracted with solutions of ammonium carbonate and of potassium carbonate. The ammonium carbonate solution was acidified and a smear precipitated, indicating that the substances extracted with potassium hydroxide had undergone change. The filtrate from this smear yielded a quantity (0.1 g.) of vanillic acid that melted after recrystallization from water at 204–205°. A methoxyl determination was carried out upon this, by the Zeisel method as modified by Perkin.

Calc. for $C_8H_8O_4$: OCH_3 = 18.4 per cent. Found: 18.3 per cent.

The potassium carbonate extract contained a small quantity of umbelliferon.

The potassium hydroxide extractions were made with successive portions of 100 Cc. of a one per cent. solution. These were each washed once with ether and then acidified with hydrochloric acid and the sumbul resin acid was again extracted with ether. The ether was removed and the residues were dried in a vacuum over sulphuric acid. The first four extracts weighed about 12 g. each and the fifth to the tenth and last extract were smaller. Fourteen grammes of material could not be extracted with 1 per cent. potassium hydroxide solution. The fractions of this resin acid were examined and found to be mixtures, although they were all similar light-colored powders when dry and of a hygroscopic nature. When very slightly moistened with alcohol they became exceedingly sticky and resinous.

Fraction III. This was a typical product. It softened at 56–60° and became translucent at 63°, and decomposed with effervescence at 75–85°. It was analyzed: C = 72.3 per cent.; H = 8.1 per cent. It had an acid number of 118–122, and was optically active.

0.474 g. made up to 50 Cc. with 95 per cent. alcohol showed a rotation of —1.18° in a 2 dcm. tube, whence $[a]_D^{21.5} = -62.2°$.

Fraction IV. This fraction softened at 50° and was completely translucent at 53°. It effervesced at about 80–90°. Analysis showed: C = 73.3 per cent.; H = 8.2 per cent.; acid number = 123.

0.3942 g. made up to 20 Cc. with 95 per cent. alcohol showed a rotation of 2.22° in a 2 dcm. tube, whence $[a]_D^{19} = -56.3°$.

Fractions V and VI. The optical rotation was taken.

V. 0.4293 g. made up to 20 Cc. with 95 per cent. alcohol showed a rotation of 1.98° in a 2 dcm. tube, whence $[a]_D^{20} = -46.0°$.

VI. 0.7665 g. made up to 20 Cc. with 95 per cent. alcohol showed a rotation of 1.56° in a 1 dcm. tube, whence $[a]_D^{22} = -40.6°$.

It is therefore obvious that this sticky acid of a resinous nature, which forms a most conspicuous part of sumbul extract and gives the latter its disagreeable properties, is not a homogeneous body. The presence of vanillic acid in the solution after prolonged standing of the alcohol solution suggested that this phenolic acid represents a part of the structure of the complex resin and a methoxyl determination of the resin acid further indicates this.

Subst. 0.1918 g.: $CH_3I = 0.0641$. Found: $OCH_3 = 4.4$ per cent.

Vanillic acid was prepared from this resin acid as follows: thirteen grammes were boiled for several hours with 5 per cent. alcoholic sulphuric acid. The alcohol was removed by steam distillation. The steam distillate contained a small amount of a blue oil resembling the essential oil.

The contents of the flask were shaken with ether, which was then extracted with solutions of ammonium carbonate, potassium carbonate, and potassium hydroxide. From the first of these extracts vanillic acid melting at 205–206° was isolated. The weight was 0.5 g. The potassium carbonate extract yielded umbelliferon (0.05 g.) melting at 225–227°. Nothing definite could be isolated from the potassium hydroxide solution.

The chloroform extract of the resin (46 g.) was divided into two

parts. The first (26 g.) was redissolved in chloroform and extracted with the various alkaline solutions, but nothing definite could be separated by this process. Most of the material was extracted with potassium hydroxide solution. Twenty grammes were hydrolyzed with 5 per cent. alcoholic sulphuric acid. Umbelliferon (0.85 g.) melting at 226–227° was isolated. This was present in glucosidic combination, as 1.5 g. of *d*-phenyl glucosazone melting at 206–207° was isolated.

The ethyl acetate extract of the resin (19 g.) was a dark-colored resinous product. Upon hydrolysis a small amount of umbelliferon melting at 226–227° was isolated, but sugar was not formed. The material is therefore not glucosidic.

The alcohol extract of the resin (18 g.) agreed in its properties with the brown glucosidic powder isolated from the amyl alcohol extract of the constituents soluble in water. Umbelliferon and a reducing sugar were found as products of an acid hydrolysis.

KALAMAZOO, Mich.

QUARTERLY REVIEW ON THE ADVANCES IN MATERIA MEDICA AND PHARMACY.

BY JOHN K. THUM, PH.G. Pharmacist at the German Hospital, Philadelphia, Pa.

THE U. S. PHARMACOPŒIA.—The outstanding event since the last quarterly was written is undoubtedly the appearance of the Pharmacopœia of the United States, Ninth Revision, and the appearance at practically the same time, of the National Formulary, Fourth Edition. While it may be undoubtedly true, as some critics contend, that both books were a long time in the making, and particularly the Formulary, now that they are in our possession, and we study their contents, it is readily realized that the exigencies caused by the enactment of the Food and Drugs Act of June, 1906, when these two books were made the legal standard for drugs, required that this revision be approached from an entirely different viewpoint. Making these two books the legal standard for drugs and medicines had a very stimulating effect in altering the viewpoint of manufacturers and others. Whereas in former revisions it was wellnigh impossible to obtain information from them, which might be useful to the committee on revision, in the present revision all were only too willing to render assistance and furnish information. To give

them all a hearing and treat them with that spirit of fair play which is characteristic of us Americans was also undoubtedly time-consuming and, in a measure, made for delay. However the books are here and even a cursory reading of them will disclose that they are a distinct improvement over their predecessors.

The use of the abbreviation "mil" in place of Cc. will probably be somewhat embarrassing for a time, particularly to workers in institutions. The metric system is just about beginning to take hold despite the fact that it has been official in this country for years; and it may be burdensome to be constantly explaining to doctors and nurses and others that five mils or ten mils, as the case may be, does not mean five or ten milligrams, but cubic centimeters. For some of us this condition has already begun. As the difference between the thousandth part of a liter and the cubic centimeter is very nearly a theoretical one, the term Cc. could just as well have been retained.

It is gratifying to see that the revision committee followed the instructions of the convention as to the desirability of giving microscopical descriptions of powdered drugs. This is as it should be. Indeed the Pharmacopœia would fall far short of being a legal standard if it had failed to give these requirements for the detection of adulterations. The descriptions of what the powdered drugs of the Pharmacopœia should look like under a microscope show care and thoroughness in the highest degree. The language is clear and unmistakable and persons interested in enforcing these requirements will have no difficulty in finding what a certain powdered drug should look like, either macroscopically or microscopically.

Perhaps the most important innovation to be found in the Ninth Revision is the giving of methods for the biological assaying of drugs for which it is impossible to determine activity by the ordinary chemical means. The drugs for which methods of assay are given are cannabis, aconite, the digitalis series (digitalis, strophanthus, squill) and suprarenal gland. For the assay of members of the digitalis series the commonly used "one hour frog" method is advised. With the exception of cannabis, the assay of which is compulsory, likewise its preparations, the others are merely optional.

Another innovation, one entirely in keeping with the spirit of progress, is a chapter on sterilization. The information given on this important subject is rather brief and rudimentary, yet sufficient for most problems the everyday, busy pharmacist may be called

upon to solve. In this connection it may not be amiss to call attention to the fact that the revised National Formulary also contains a chapter on sterilization and one that goes a little more fully into the subject.

It is frequently the experience of pharmacists to have calls from their physician friends for information and material for the making of various reagents and test solutions to be used as aids in establishing a diagnosis. And it many times happens that the information required is so widely scattered in the various text-books that it is almost impossible for the pharmacist to assemble it for ready reference. The revision committee has taken cognizance of this and in the present Pharmacopœia nearly ten pages are devoted to valuable information concerning diagnostical reagents and clinical tests.

Alcoholic liquors, such as brandy, whisky, and white wine, have been dropped from the revision, and so have all of the medicated wines. The latter, however, have been entered in the National Formulary, and white wine is recognized in Part Second of the Formulary as Vinum Xericum (Sherry Wine).

The popularity of powdered extracts has been recognized and this class of pharmaceuticals greatly enlarged; the advantages of the powdered over the solid extracts from the standpoint of dispensing are well-known to busy pharmacists, and this change will be greatly appreciated by them.

Keeping always in mind the fact that the book is looked upon by many as a book of standards, the committee has also greatly enlarged the number of assays. No pharmacist should experience any difficulty in performing these as the methods given are invariably simple and easy of execution.

The custom of having in the front of the book a comparative table showing the strength of the more important pharmacopœial substances and preparations, in the preceding and in the present Pharmacopœia, is continued. The number of pages for this table has been increased. This custom is a most desirable one, as it enables the pharmacist to prime himself very easily with information that will frequently be demanded from him by physicians.

The fore part of the Pharmacopœia contains six pages devoted to a comparison of International Protocol drugs and preparations with similar drugs and preparations of the Ninth Revision. This is in the form of a table, and will be found to be a great convenience to the pharmacist as it will enable him to see at a glance what the

P. I. demands as to titles and requirements and how closely the U. S. P., Ninth Revision, follows them. By way of illustration we give this about digitalis:

DIGITALIS	P. I.	U. S. P. IX
Digitalis purpurea (L.)		
Title	Digitalis folium seu Folium Digitalis	Digitalis
Requirement	The leaf of the second year	Assayed biologically. Leaf of second year not required.
Tinctura digitalis		
Title	Digitalis tinctura seu Tinctura Digitalis	Tinctura Digitalis.
Strength	10 per cent.	100 mils from 10 Gm. (approx.).
Menstruum	Alcohol, 70 per cent.	Alcohol, 75 per cent.
Requirement		May be assayed biologically.

Thirty-five drugs and preparations are listed in the above manner and, as can be noted, the standards of the Protocol are not literally adhered to. Of course, the questions of standards and proper menstruums for the exhaustion of drugs will always be more or less debatable ones. Making due allowance for this, we believe that the question of international standards will, in time, be satisfactorily solved. Take the question of when the leaves of digitalis should be gathered; in this country it seems to have been pretty well establishd by biological examination that the leaves of the first-year growth are as active as those of the second or third. The P. I. requires aconite to be the tuber of the current year, while in this country it has been determined that this requirement is not necessary.

The admissions to the Pharmacopœia number 67; this includes Aqua Destillata Sterilisata. Atophan has also been made official under the name Acidum Phenylcinchoninicum. Although this synthetic enjoys no patent rights, it has all the advantages that go with a U. S. trademark. This virtually gives the foreign firm that manufactures it and puts it out in this country under its coined name, a monopoly; and it is only under such coined name that physicians know of it. It will be a long, long time before the physicians of this country ask or write for it under its official name or abbreviation. At the present time is is impossible to obtain this chemical on account

of the war. If the pharmacopœial text or definition of this drug contained the words " Acidum Phenylcinchoninicum, a name applied to Atophan" or, better still, gave the name "Atophan" as a synonym, perhaps it would have been some inducement to American chemical manufacturers to supply the public with this drug, at least during the war. Previous to the war it was selling at $1.40 an ounce and at this price a handsome profit certainly must have been the maker's reward.

While the book still contains many drugs that advanced thinkers in medicine regard as obsolete, yet some two hundred and fifty articles have been deleted. This may not be progressing as rapidly as some would wish toward the goal of simplicity in the prescribing of medicines to the sick, yet it will be regarded by those who believe in going forward slowly and giving consideration to all interests, as quite a concession, and one that is in keeping with the times.

Of course the greater number of the dismissed articles were promptly put into the National Formulary, so they will always be available to those physicians who may think that they need them in the practice of medicine. There would be little loss to humanity if they were all allowed to rest forever in innocuous desuetude.

The general principles laid down by the Pharmacopœial Convention for the guidance of the committee on revision have been closely adhered to. Every page gives evidence of this fact, and the result is that the American pharmacist has a Pharmacopœia for his guidance and the safeguarding of his calling, and, one might say, the protection of the public, that is second to none.

The National Formulary has been considerably enlarged, the volume now numbering 394 pages, this giving it 127 pages increase over the third edition. The custom of making the Formulary the repository of all articles and preparations discarded from the Pharmacopœia accounts for this, but not wholly. The legalization of the book, as we mentioned before, made it necessary that the revision must be made from the viewpoint of standardization; consequently, the drugs and chemicals used in this book had to have standards provided for them, it rightfully being conceived unthinkable that another book should be referred to as containing the standard for a chemical, drug, or preparation, as had been done in previous revisions of the Formulary. This accounts for the further enlargement of the volume, Part Second of the book consisting altogether of standards of drugs and chemicals used in the various formulas in Part

One, 98 pages being devoted to excellently written descriptions and standards to the number of 188. These monographs are a creditable piece of work.

Part Three consists of special tests and reagents. Tests are given for arsenic, including Bettendorf's test, heavy metals; assay for bromides, chlorides, or iodides; assay for alkali salts of organic acids; determination of ash or non-volatile matter; determination of crude fiber, etc.

With the exception of the number of pages, which, of course, is considerably more, the book resembles the Pharmacopœia very much, so closely does it follow the nomenclature, descriptions, and general style of that book.

A serious attempt has been made to improve many of the formulas. We presume that the committee on revision found that Elixir Digestivum Compositum was beyond improvement, as we find no trace of this much-discussed preparation in the present revision. It is probably among the "dropped." There were 183 formulas discarded, among them Magma Magnesia; this preparation has, however, been inserted in the Ninth Revision. Just why the pharmacopœial committee evinced such regard for it, it is impossible to say. The committee not only abstracted it for its own but completely altered the procedure for making this popular preparation.

We have looked in vain among the 183 "dropped" formulas to see if our old friend Warburg's Tincture, scientifically (?) known as Tincture Antiperiodica, had met such a fate. If ever a preparation deserved to be cast into the limbo of oblivion surely this is it. It has two glaring faults, faults that modern pharmacy cannot afford to countenance, namely: a therapeutic title and "polypharmacy." Discarding a preparation of this type would not invoke any more hardship than the other discarded ones might; any time the formula might be needed all that would be necessary would be for the pharmacist to refer to the previous edition of the National Formulary. And surely the average pharmacist has that much intelligence! It is hard to fathom why the committee failed to arise to the occasion.

Although 23 elixirs have been discarded, no physician need ever be at a loss as to prescribing any of this class of preparations, as the book contains 76, although this is twelve less than before. We shed no tears when we allowed our glance to wander over the twelve plus eleven and realized their utter uselessness. The elimination of

twelve fluidextracts was also regarded by us with considerable complacency. Indeed, we must commend the committee for the stand it took when it ordered the dropping of 183 formulas. It augurs well for the future.

We cannot help but deprecate the large number of petrox preparations the book contains. The efficacy of this class of preparations, we fear, has been greatly over-rated. If a physician wishes his patient to have iodine by local absorption surely five per cent. in liquid petrox should, and does, answer every requirement. So why the presence of Petroxolinum Iodoformi? What possible use can a liquid petrox containing three per cent. of sulphur have? And a Compound Sulphurated Petrox, which has only 0.3 per cent. of sulphur? And why a Venice Turpentine Petrox? Why a Tar Petrox? When a doctor wants to use tar locally, he prefers an ointment, and so will his patient after one experience with a greasy liquid.

Unquestionably an ointment is the ideal method of application for this drug. There are twenty of this class of preparations in the book. We would advise that pharmacists only make these preparations as called for. This is particularly desirable for those containing iodine.

A class of preparations has been introduced called "nebula." These are oil sprays with Light Liquid Petrolatum as the vehicle or base. They should prove immensely popular with physicians once they get to know about them from the retail pharmacist. Indeed, there are many things in this interesting book that the physician should know about, and, undoubtedly, would be pleased to hear about them if pharmacists would only take the time and trouble to bring them to his attention. We think that in order to do this successfully, however, the pharmacist must show a nice discrimination in his choice of the preparations he would "talk up" to his physician friends.

It certainly is to be regretted that the committee on revision did not see fit to place Decolorized Tincture of Iodine among the "dropped" ones. Surely, among the group of eminent pharmacists who comprised the committee there were those whose chemical knowledge must have whispered to them that the title is a misnomer and the preparation an absurdity! This is one of the preparations that the retail pharmacist had better not call to the attention of his physician friends.

We cannot help but feel that in the past the National Formulary has been regarded more or less as the scrap-heap for formulas and preparations from all sources. The time will soon be here, if it has not already arrived, when the use of this book as a scrap-heap for discarded formulas and preparations from the United States Pharmacopœia must cease. We are prompted to this remark by looking over the list of fluid extracts dropped from the Pharmacopœia and promptly made part of the National Formulary. Practically all of these are worthless from a therapeutic standpoint, and, for this reason were dropped. If they were worthless from a therapeutic standpoint for inclusion in the Pharmacopœia they surely were worthless from the same standpoint for inclusion in the National Formulary! To that it will probably be replied that it was necessary to put them there so that there be a record of them. But this is not so; they would always be available to those who might want to use them. Then again we often hear it said that somewhere in the country there are some physicians who use these obsolete preparations and we must have a standard for them. This again is a poor argument, no argument at all! They would always be available and the source from which they were obtained would also contain a standard and would, we believe, be regarded as a legal one.

We think that the National Formulary is a good book and to a great extent answers the needs of the pharmaceutical profession. And it may be that it answers the needs of the medical profession. We do not know positively as to the latter. It could, however, be made a more potent influence for good to the medical profession if it were more educational. There is no reason why the National Formulary should not undertake to teach prescribing to physicians.

Both the Pharmacopœia and the National Formulary should be representative of the time and period in which they are issued; to be this they must also be educational, and to be educational they must reflect the best thought and endeavor of the professions of medicine and pharmacy.

Spices as Preservatives.—Experimental work of a bacteriological nature discloses the fact that the value of most of those articles that we refer to as spices have very little preservative or antiseptic power. It was found that when cinnamon, cloves, or allspice are used in large amounts the development of moulds may be retarded; in conjunction with vinegar the spices show greater antiseptic power. The writer thinks that the cinnamic aldehyde,

which is the active principle of these spices, might be used in dilutions to be of value in preventing the growth of many micro-organisms and yet sufficiently weak so as not to interfere with the flavor of the article preserved. It was found that pepper and nutmeg have very little retarding effect on the growth of micro-organisms, although cinnamon was found to be quite effective for this purpose. Experiments with alcoholic solutions of the essential oil from these spices proved that cinnamon is the most effective for preservative purposes, followed in order by cloves and allspice. The author also found that bacteria appear to be less sensitive to the action of spices than moulds. (*Jour. Ind. Eng. Chem.*, 1916, 8620, by Freda M. Bachmann.)

A Fatal Case of Poisoning With Ammonium Sulphocyanide.—This chemical is commonly regarded as being harmless but there is record of some cases of poisoning after taking large doses of the salt although without death as a sequence. Recently death followed the taking of a large amount with suicidal intent. (*Jour. Pharm. Chem.*, 1916, 14, 87.)

Inositol in Brain Matter.—It is possible to extract this substance from the human or ox brain by extracting it with acetone. The acetone is then gotten rid of by distillation and the residue precipitated, first with neutral lead acetate, then with basic lead. The inositol is obtained from the second precipitate. It is the same as that found in plants—*i*-inositol. (*Chem. Soc. Abstr.*, 1916, 110, 523.)

Cause of Variation in the Radium Emanation Content of Spring Water.—Measurements made weekly over a period of nine months elicited the interesting information that the radio-activity of two springs in Indiana increases and decreases as the flow of water is greater or less. It is reasonable to suppose that these facts, and the further information that the highest values for radium emanation were obtainable from "wet weather" springs a short time after very heavy rain falls, logically point to the conclusion that the surface water, in percolating through the soil, dissolves and carries down with it some of the emanations which is constantly moving upwards from the earth centre to the surface. During the dry weather, of course, when the pressure of the water is not so great and the flow considerably less, a large proportion of the dissolved emanation is changed into products and lost, before the water issues from the ground. (R. R. Ramsey, *Phys. Review*, 1916, 7,

284; *Chem. Abstr.*, 1916, 10, 1811, through the *Pharm. Jour. & Pharmacist*, Sept. 2, 1916.)

IDENTIFICATION OF CROTON OIL.—The following is suggested as a means of showing the admixture of other oils with that of croton: The sample of oil is shaken with twice its volume of absolute alcohol; the clear solution is then layered on to a highly concentrated solution of potassium hydroxid in a test tube, this mixture is then warmed for thirty minutes in a boiling water-bath and allowed to stand. At the point of contact of the two liquids, an intense reddish-brown or reddish-violet ring forms. This reaction is stated to be very characteristic. (*Jour. Pharm. Chem.*, 1916, 14, 38, by J. Cante, through *The Pharm. Jour.& Pharmacist.*)

PURE SODIUM CHLORIDE.—Common salt that is free from potassium chloride is practically unobtainable, even those packages labelled "C. P."are not true to label. Examination of samples purified according to various accepted methods have shown the presence of potassium chloride to the extent of 0.27 to 0.48 per cent. Some samples labelled chemically pure were shown to contain as much as 0.45 to 0.57 per cent. The presence of the potassium could be plainly made out or seen with the flame test, using a piece of blue glass. The process used for separating the sodium and potassium chloride is as follows: About 0.5 grams of the salt is dissolved in a little water, and about 1 mil of a 10 per cent. solution of platinic chloride added. A few drops of water are added, and the mass moved backwards and forwards until it flows readily. Care must be taken in this, as too little water fails to dissolve all the $NaPt_2Cl_6$, and too much dissolves some K_2PtCl_6. The mixture is then filtered and then washed first, 5 or 6 times with a mixture of one volume of water and a half volume of alcohol, then with a mixture of alcohol and ether for six washings. After drying the precipitate it is placed over a weighed platinum crucible and washed into the crucible with boiling water. (C. Lohman, *Chem. News*, August 4, 1916, 53.)

GRAPES AS AN ARTICLE OF FOOD, AND AS A DIETETIC PRESERVATIVE.—It is claimed that the unfermented juice of the grape, and the pulp, when mixed with meat which has first been ground, blood, and yolk of egg, and even milk, seem to modify the protein, seemingly making it more digestible, as well as increasing its keeping properties. While the preservative action of grape juice is hard to

account for yet it is sufficiently effective to open up an important field of application to commercial dietetics in grape-growing countries. It is suggested by the author that many new foods may be prepared in this manner. (E. Bertarelli, *Jour. Amer. Med. Assoc.*, 67, 243, 1916.)

Treatment of Hay Fever.—The results of the treatment of hay fever with pollen solutions and calcium chloride have been noted, 26 cases with the former and 22 with the latter; it is brought out in this note that the decrease to susceptibility of hay fever is markedly noticeable in a small percenltage of victims if this means of treatment is begun early enough. Great stress is laid on the fact that much care and understanding is necessary in the preparation of these solutions for therapeutic use. If not properly made or used very serious, and perhaps fatal, reactions may occur. In the use of calcium chloride, on the other hand, and which rests largely on empirical observation, if large enough doses are given and begun very early and over an extended period of time, a large number will receive marked benefit. The use of calcium salts is without any danger and can be easily given by the general practitioner. It is also noticeable that the spring variety of hay-fever is more amenable to treatment than the autumn. (H. Wilson, *Jour. Amer. Med. Assoc.*, 1916, 318.)

South Australian Olive Oil.—Olive oil from Australia is said to be of very superior quality and its production increasing every year. The production is sufficient to supply all of that country and quite a quantity of it is shipped to England. Those interested in this industry in that country have every reason to be optimistic. (*Australas. Jour. Pharm.*, 1916, 31, 284.)

Pleurotus Japonicus.—This is a fungus that is luminous and very poisonous. Its growth takes place on the decaying trunks of the beech trees in Japan. Recent study shows that the light is emitted from the gills, and that these are luminous all over; also that the range for luminosity is 3°—40° C. It is stated that 100 square centimetres of luminous area gives light enough for reading and the light can be noticed for a distance of 30 metres. The toxic properties of this fungus are not destroyed by heating. (Katamura, *Jour. College Sci.*, Tokyo, vol. XXXV, 1, through *Nature*, 1916, 504.)

Formaldehyde in Pruritus Ani.—The discomfort and annoyance accompanying this condition are such as to prompt one to use

almost anything recommended for its treatment. The author advises the use of a starch jelly containing from one to two per cent. of formalin (that is the official solution of formaldehyde gas). The jelly is preferable to a greasy ointment. If the application should prove too irritant it is more readily washed off; it is said when this is done the sting at once disappears. The writer has used this preparation in many cases, even chronic ones, and always with success. It seems to be much better than treatment with iodine, and compares very favorably with X-ray treatment. (*Brit. Med. Jour.*, 1916, 244, J. Cropper.)

BOOK REVIEW.

ANNUAL REPORTS OF THE CHEMICAL LABORATORY OF THE AMERICAN MEDICAL ASSOCIATION, Volume 8, Jan.–Dec., 1915.—This handy little volume contains much that is of interest to a pharmacist. Perhaps one of the most interesting is a report on "The Quality of Commercial Blaud's Pills." This report takes up the claims made for some of the ready made tablets and soft-massed pills as to solubility and ferrous carbonate content. Considerable variation was shown to exist in regard to solubility, and especially was this variation shown to be considerable among pills of the same make and same brand. It is admitted in the report that the commonly assumed instability of ready-made Blaud's pills is without fact and that the assumption that so-called "nascent" preparations, soft-mass pills, and gelatine capsules with oily suspension of this chemical, are superior to the ordinary pill, is without warrant or fact! However, it is advised that physicians will do better for their patients if they insist that the pharmacist make the pills freshly according to the U. S. P. whenever they are ordered by the physician.

Much valuable information is contained in the report of "An Examination of Several Commercial Specimens of Opium Alkaloids or Their Salts." This is most comprehensive and embraces a number of desirable features, among others a chart showing color reactions of some of the opium bases.

One very admirable feature of these chemical reports is the fact that very detailed descriptions are given of the methods of analysis and technic followed in the investigation of the substances under examination. This feature should make them of inestimable value

to pharmacy students, for they show clearly that keen observation and painstaking attention to details is requisite in drug analysis; without it there can be no work of real value accomplished.

In the preface it is stated that "the reports of the Laboratory are published in order that its findings may be readily available to those who are interested in the composition of medicines, namely, drug analysts, food and drug authorities, pharmacists, and others."

JOHN K. THUM.

COMPLIMENTARY DINNER TO PROF. SAMUEL P. SADTLER.

To graduates of the Philadelphia College of Pharmacy, and especially to Prof. Samuel P. Sadtler, Wednesday, September 6, 1916, will long remain the red-letter day of the Convention of the American Pharmaceutical Association held during the week of September 4th in Atlantic City.

The Alumni Association of the Philadelphia College of Pharmacy and friends of Dr. Sadtler selected the evening of this day to pay a well-deserved tribute to one who, after 38 years of active teaching of chemistry at the Philadelphia College of Pharmacy, has decided to take a well-earned rest from this phase of his manifold activities.

A complimentary dinner to Professor Sadtler had been arranged at the Hotel Traymore on this evening, and was attended by many former students, and friends of the honored guest, who had come from all parts of the country to attend the sessions of the American Pharmaceutical Association. A special excursion of Philadelphia druggists to "America's greatest seashore resort" also brought a large number of local alumni and friends to this spread.

Prof. Joseph P. Remington was the toastmaster of the evening and as is customary, played his rôle to perfection. He first called on President Howard B. French who complimented Dr. Sadtler on his fruitful efforts expended in the capacity of a teacher at the Philadelphia College. Mr. French also took occasion to announce to the assembled gathering the merger of the Medico-Chirurgical College Department of Pharmacy with the Philadelphia College, and welcomed the members of the "Chi" alumni and faculty who were present.

Professor Remington then called on Dr. P. Samuel Stout, Chair-

man of the Centennial Fund Committee of the Alumni Association, who in a few words paid a tribute to Dr. Sadtler, speaking as a former student and member of the Alumni Association, and then on behalf of the Association presented the guest of the evening with a beautiful umbrella suitably engraved on the handle, and a bouquet of American Beauty roses. Dr. Sadtler was overwhelmed and when called upon by Professor Remington to speak he was given an ovation which lasted several minutes. Dr. Sadtler spoke as follows:

I desire first of all to express my appreciation of the kindly feeling which has impelled so many of my former students and associates to gather together in this way to show their affection for me.

The beautiful gifts which Dr. Stout has just presented on behalf of the Alumni have also touched me greatly, as they were entirely unexpected and have come as a complete surprise.

As a matter of interest I would like to recall the circumstances under which I became connected with the Philadelphia College of Pharmacy in 1878. I was a young Professor of Chemistry at the University of Pennsylvania delivering the lectures on General Chemistry to undergraduates at that institution. Among my students at that time were the sons of the well-known drug firm, Bullock & Crenshaw, and Mr. Chas. Bullock the head of that firm was at that time the first Vice-president of the College. I suppose he got from the young men a favorable report as to my qualities as a lecturer, and one day I was surprised to receive a call from him at my room at the University, and he made the proposal on behalf of the authorities of the College that I come down that fall and take the position of an assistant to Dr. Robert Bridges, the Professor of Chemistry, delivering the lectures on Chemical Physics and Elementary Chemistry to the Junior Class while Professor Bridges continued to lecture to the Senior Class. After the Christmas holidays he gave up these lectures to me also, and in the spring was made Emeritus Professor. An election was then held for the succession to the Chair of Chemistry. There were two candidates of whom I was one, and I was chosen. The rival candidate, with whom I have been thrown into close acquaintance by professional services in recent years, has since told me, in answer to my question as to whether he recalled the contest, that he considers himself fortunate in escaping the teaching career for he has been exceptionally successful in business and is now the head of several large manufacturing companies.

On the other hand I consider myself fortunate in the connection I then established and which has continued during these 38 years. I severed my connection as Professor with the University of Pennsylvania in 1891 in order to be free to go into practice more fully as a chemical expert, but I retained my place in the Philadelphia College to this present year, as I enjoyed my work as a lecturer and teacher. But as a man gets on in years he comes to realize that there is a limit to his strength and he has to let up somewhere on his undertakings. So I concluded to make way for a younger man in my teaching work.

I feel satisfied that I have gained greatly in my understanding of technical chemical problems and possibilities by my having been obliged to take up and study pharmaceutical chemistry. I am satisfied too that the graduate in Pharmacy who has had a course of training such as he must have to make his degree at the Philadelphia College of Pharmacy is especially qualified to go on successfully with chemical work and has laid a good foundation for a career as a manufacturing chemist. I say this with the benefit of contact with and observation of young men in University classes as well as those in our school of Pharmacy. The young man who is a diligent student in a course such as we offer has had by the time he graduates a drill in the methods by which successful manufacturing is to be worked out when translated to wider fields.

I desire here to pay a tribute of respect and affection to the men with whom I first became acquainted when I took hold at the College of Pharmacy. My predecessor, Dr. Robert Bridges, was a quiet unassuming man with a wide acquaintance with the field of chemistry as it had been developed 40 years ago. Next in seniority was Prof. John M. Maisch, a man that all of the older people here present recall as one of the great names in American Pharmacy, and it was a sincere pleasure to me to be associated with him and to be able to discuss scientific questions with him, as he was an exceptionally well informed and many sided teacher. When I came to the College he had charge of the Chemical Laboratory which offered an optional course of study in analytical chemistry to such students as desired extra work. Of my relations with the next of the old Faculty of 1878, the present honored Dean of the College who sits now at my side, I cannot speak in the past tense. Those relations have been close and cordial for all of these years since I joined the

College Faculty and I hope they will continue for as many years as we are spared in this mundane sphere, wherever we may locate or whatever we turn to for occupation.

When I began as teacher at the College and for a year previous at the University I had as my lecture assistant a young man of great intelligence and industry. This was Henry Trimble who later, when Dr. Frederick Power had taken over the direction of the Chemical Laboratory from Professor Maisch for one year, left us to go to the University of Wisconsin, succeeded to the Professorship of Analytical Chemistry. He was a man of wide and accurate information and, above all, a lovable character with whom it was a pleasure to be associated in daily routine. After his untimely death while yet in middle age, the care of the Analytical Laboratory went for a year into the hands of his assistant, Mr. Josiah Peacock, and then under the control of my lecture assistant, F. X. Moerk, who is still "holding the fort" and turning out every year young chemical graduates whose thorough training is attested by the readiness with which they find responsible positions. I am tempted to contrast the course which was offered by the old Faculty of three with the instruction given now by a Faculty of eight together with as many instructors. I would say that what it lacked in breadth it sometimes gained in intensiveness and that more was left to the initiative of the individual. That they "got there," despite what we would now call the elementary facilities offered, is attested by the success of our prosperous Alumni of the past generation who are here represented. There is some danger of superficiality of attainment being the result when a student's time is spread over too many studies in an obligatory course, and it is frequently best to concentrate upon a group of cognate and related branches rather than to try to divide upon all subjects equally.

I cannot omit, however, to emphasize the fundamental value of chemistry to the pharmaceutical student, whether he would become a successful pharmacist or work his way over into the medical profession or go into manufacturing. We have in this country now the largest Chemical Society in the world, the American Chemical Society, with a membership of 8200, publishing three chemical periodicals which are read by chemists all over the world. The present terrible war in Europe and its direct and indirect results have brought the public to realize that this is the day for the chemist,

and a country's development and advance is largely in his hands and dependent upon the degree to which he is brought forward and put to work upon the great problems and undertakings of the country.

In conclusion, as I look back on 38 years of service as teacher at the College, I have a great satisfaction in the association I had with my former students and the feeling that I was able to be of help to them, and I prize greatly the acquaintances and friendships thus formed.

I hope to still keep up my connection and interest in the College, although no longer active in the classroom.

President Otto Kraus of the Alumni Association was next called upon and he conveyed the good wishes of the Association to Professor Sadtler. He was followed by Prof. J. W. Sturmer, who was presented to the Alumni as the new Associate Dean of the College. Dr. Sturmer responded in a few well-chosen words, expressing the pleasure of the Medico-Chi contingent at being present to help do honor to one whose service in the ranks of Pharmacy had been so long-continued and successful.

Other speakers of the evening were Dr. James H. Beal, Prof. F. X. Moerk, Dean Graves of the Department of Education of the University of Pennsylvania, Prof. Henry Kraemer and W. H. Cousins. Prof. Frank Graves represented Provost Smith of the University of Pennsylvania, who was unable to be present. He spoke of the fact that Dr. Smith and Dr. Sadtler had been colleagues on the University faculty and in fact had been teaching the same subject at this institution. This, said Dr. Graves, was only one of the many links of friendship between the Philadelphia College and the University. Professor Kraemer in a few stirring remarks called attention to the many excellent qualities which had made Professor Sadtler famous as an investigator and scientist and loved as a teacher.

The evening closed with the singing of "Auld Lang Syne" by the assembled gathering, and those present then conveyed their good wishes to Professor Sadtler in person.

The Committee in charge of the dinner included the following: Howard B. French, Otto Kraus, Walter V. Smith, Theodore Campbell, Charles Rehfuss, Joseph P. Remington, Freeman P. Stroup, Warren H. Poley, Dr. P. Samuel Stout, W. L. Cliffe and Joseph W. England.

R. P. F.

NEW FORMULÆ.

Syrup of Ferrous Iodide.

William G. Toplis (*Proc. Penn. Pharm. Assoc.*, 1916) gives a modification of the U. S. P. process designed to produce Syrup of Iodide of Iron in a hurry. The *Pharmacopœia* directs the use of iron in the form of bright, fine wire cut in small pieces, with the result that the process is long and unnecessarily drawn out and subjects the solution to prolonged risk of oxidation. In order to reduce both objections to a minimum, substitute reduced iron for the bright wire and modify the manipulation as follows:

Introduce all of the iodine, and all of the water at once, into a flask of large or ample proportions, then add the iron in small successive portions, constantly whirling the liquid in the flask. In a few minutes all the iodine is combined. Add the first portion of sugar to the flask and the solution is ready for the filter—in eight minutes from start to finish. Complete the preparation according to the Pharmacopœial directions.

Chocolate Syrup.

Charles R. Rhodes (*Proc. Penn. Pharm. Assoc.*, 1916) proposes the following formula for making an improved chocolate syrup for soda fountain use;

Powdered Cocoa	1 lb.
Sodium Chloride	6½ drams. (Apoth.)
Granulated Sugar	16 lbs.
Shredded Gelatin	2½ oz.
Tincture Vanilla, U. S. P.	2½ fld. oz.

Water sufficient to make 2½ gallons.

To prepare this quantity of syrup, use a three gallon tin bucket with No. 40 wire strainer attached. Dissolve the gelatin in 10 pints of cold water, heat to the boiling point, then add 15 pounds granulated sugar, stirring occasionally until dissolved. Triturate one pound granulated sugar with powdered cocoa and sodium chloride until thoroughly mixed, then add hot solution; boil for 10 minutes, stirring constantly; strain while hot and when cool add the tincture of vanilla.

INDEX

TO VOLUME 88 OF THE AMERICAN JOURNAL OF PHARMACY.[1]

AUTHORS.

Barnitz, Harry L. The Technical Production of Hydrogen and Its Industrial Application 264
Beringer, George M. Pharmacopœial Standards for Whisky and Brandy 49
Some of the Changes Made in the Ninth Decennial Revision of the United States Pharmacopœia 358
Beringer, George M., Jr. Why Applicants Fail to Pass the State Board Examinations 403

Clarke, F. W., T. E. Thorpe, and W. Ostwald. Annual Report of the International Committee on Atomic Weights, 1916..... 82
Collins, Dr. Joseph V. A Metrical Tragedy 147

Dox, Arthur W. and G. P. Plaisance. A New Method for the Determination of Vanillin in Vanilla Extract 481

Fischelis, Robert P. Pharmaceutical Exhibit at the Philadelphia College of Pharmacy 529

Hart, Merrill C. Note on Algerita Root 301
and Frederick W. Heyl. Some Constituents of Sumbul Root..... 546
Haskell, Charles C. Seasonal Variation in the Resistance of Guinea-pigs to Poisoning by Tincture of Aconite 243
and H. B. Thomas. A Comparison of the Results Secured by the Use of the Guinea-pig and Cat Methods for the Assay of Tincture of Aconite 3
Haynes, M. H., and E. L. Newcomb. Hyoscyamus Cultivated in Minnesota: Moisture, Ash and Alkaloidal Content 1
Heyl, Frederick W., and Merrill C. Hart. Some Constituents of Sumbul Root 546
Hoffstadt, Rachel E. The Vascular Anatomy of Piper Methysticum 485
Houseman, Percy A. The Constituents of Licorice Root and Licorice Extract 97

Kraemer, Henry. Samuel P. Sadtler, Ph.D., LL.D., Retiring Professor of Chemistry and Dean of the Department of Special Technical Instruction 289
Some of the Early Teachers in Pharmacognosy in America..385, 433

LaWall, Charles H. The Percentage of Alcohol in Home-made Root Beer 355
Lloyd, John Uri. Experimental Demonstrations of Adhesion Alkaloidal Reactions 217
Loeb, Prof. Leo. General Problems and Tendencies in Cancer Research 310

[1] Compiled by M. G. Smith.

Martin, John Albert. Citric Acid by Fermentation..... 337
Merrill, M. C. Some Relations of Plants to Distilled Water and Certain Dilute Toxic Solutions 12, 71, 156
Morland, Robert L. State Board Examination 253
Mueller, Bertha. German Drug Prices for 1916 308
The Official Preparation of Senega 241

Nelson, C. Ferdinand. Back to the Chemist's Shop 246
The Future of Pharmacy in America 65
The Pharmacist as the Future Municipal Chemist and Bacteriologist 145
Newcomb, Edwin L. American Pharmaceutical Association: Minutes of the Atlantic City Meeting 463
National Association Boards of Pharmacy: Thirteenth Annual Convention 477
Thirteenth Annual Convention of the National Association Boards of Pharmacy 520
and M. H. Haynes. Hyoscyamus Cultivated in Minnesota: Moisture, Ash and Alkaloidal Content 1

Ostwald, W., F. W. Clarke and T. E. Thorpe. Annual Report of the International Committee on Atomic Weights, 1916..... 82

Peacock, Josiah C. and Bertha L. DeG. Some Experiences in Preparing Emulsion of Silver Iodide 452
Plaisance, G. P., and Arthur W. Dox. A New Method for the Determination of Vanillin in Vanilla Extract 481

Ruoff, John S. Pyorrhœa Alveolaris. Preliminary Report on Treatment with Ipecac and Emetin Hydrochloride..... 164

Salkover, Benedict. A Method for the Determination of Salol and Acetanilid in a Mixture of the Two, and of Salol and Acetphenetidin in their Mixtures 484
Saylor, W. M. The Standardization of Drugs by the Use of Germinating Plants 8
Seidell, Atherton. Vitamines and Nutritional Diseases: A Stable Form of Vitamine, Efficient in the Prevention and Cure of Certain Nutritional Deficiency Diseases 410
Sievers, Arthur F. The Possibility and Value of Improving the Belladonna Crop Through Selection 193
Smith, Carl E. Comparison of the Methods of the United States and British Pharmacopœias 292
Note on Testing Calcium Compounds 215

Talbot, Henry P. The "Noble" Gases: How the "Nitrogen" of a Generation Ago Has Been Made to Yield Six, and Possibly Seven, Elements and the Value of this Discovery to Chemistry 220
Thomas, H. B., and Dr. Charles C. Haskell. A Comparison of the Results Secured by the Use of the Guinea-pig and Cat Methods for the Assay of Tincture of Aconite 3
Thompson, H. L. The Assay of Spirit of Peppermint..... 303
Thorpe, T. E., F. W. Clarke and W. Ostwald. Annual Report of the International Committee on Atomic Weights, 1916..... 82
Thum, John K. Medicated Waters 401
Quarterly Review on the Advances in Materia Medica and Pharmacy 113, 256, 416, 563

Wilbert, Martin I. Cosmetics as Drugs. A Review of Some of the Reported Harmful Effects of the Ordinary Constituents of Widely Used Cosmetics 105
Some Fallacies Regarding Phenol: A Review With Reports of Observations on the Influence of Ethyl Alcohol on the Germicidal and on the Toxic Properties of Phenol.....364, 425
The Pharmaceutical Exhibition in Philadelphia..... 448

Youngken, Heber W. The Importance of Drug Plant Cultivation in the United States 171

SUBJECTS.

Acacia, Tests for 260
Acid, Acetylsalicylic 424
Citric by Fermentation (Martin)..... 337
Nitric, powder 119
Oxalic produced by a Penicillium 125
Aconite, Russian 421
Chemical Standardization Useless 421
Tincture of, Seasonal Variation in the Resistance of Guinea-pigs to Poisoning by Tincture of (Haskell)..... 243
A Comparison of the Results Secured by the Use of the Guinea-pig and Cat Methods for the Assay of (Haskell and Thomas) 3
Alcohol, Ethyl, on the Germicidal and on the Toxic Properties of Phenol, a Review with Reports of Observations on the Influence of (Wilbert) 364, 425
In Home-made Root Beer, the Percentage of (LaWall)..... 355
Algerita Root, Note on (Hart) 301
Alkaloidal Reactions, Adhesion, Experimental Demonstrations of (Lloyd) 217
Alkaloids, Color Reactions 121
Alkaloids, Estimation by Hydrochloride Method 420
Alival 125
Aloes, Color Reactions for 262
American Medical Association 257, 417
American Pharmaceutical Association 113
Ammonium Sulphocyanide, Poisoning with 571
Anthrax Spores Killed by Sodium Hydroxide..... 419
Antimony from Alaska 422
Antitoxins, Principles Underlying Use of 120
Asphalt and Petroleum in the United States 190
Aspidium, Oleoresin of 31
Atomic Weights, 1916, Annual Report of the International Committee on (Clarke, Thorpe and Ostwald) 82
Atoxyl, Estimation of 123
Aurocantane 124

Bacterins, Principles Underlying Use of 120
Belladonna Crop Through Selection, the Possibility and Value of Improving the Commercial (Sievers) 193
Variation in Alkaloidal Content 121
Benzoic Acid Adulterated 428
Brandy and Whisky, Pharmacopœial Standards for (Beringer).... 49
Buchu King, The, Henry T. Helmbold 23
Buttermilk Cult, Origin of 280

Caffeine, Manufacture in Japan 121
Calcium Compounds, Note on Testing (Smith) 215
Cancer Research, General Problems and Tendencies in (Loeb).... 310
Caramel, Detection in Flavoring Extracts 262
Chattanooga Medicine Company, Suit against A. M. A..... 417
Chemistry and Preparedness 117
Applied, Abstracts of Papers on 187
How the "Nitrogen" of a Generation Ago Has Been Made to Yield Six, and Possibly Seven, Elements and the Value of this Discovery to (Talbot) 220
Retiring Professor of and Dean of the Department of Special Technical Instruction, Samuel P. Sadtler, Ph.D., LL.D. (Kraemer) 289
The "Noble" Gases: How the "Nitrogen" of a Generation Ago Has Been Made to Yield Six, and Possibly Seven, Elements and the Value of this Discovery to 220
Chemist's Shop, Back to the (Nelson) 246
Cignolin 422
Citric Acid by Fermentation (Martin) 337
Colds, Etiology of Common 421
Color-blindness 288
Reactions 121
Colors in Food 185
Correspondence:
Course in Home Sanitation and the Prevention of Diseases by the Extension Division of the University of California 128
Cultivation of Medicinal Plants 175
Dope Law Reduces Sale of Narcotic Drugs 80 per cent..... 129
Helmbold, Henry T. 87
Increase of Prices for Drugs and Chemicals 173
Procter Memorial 86
Whisky and Brandy in the U. S. Pharmacopœia.....27, 126
Cosmetics as Drugs. A Review of Some of the Reported Harmful Effects of the Ordinary Constituents of Widely Used Cosmetics (Wilbert) 105
Cultivation in the United States (Youngken) 171
of Medicinal Pants, The 37, 175, 429

Dancing Mania 282
Diabetic Foods 283
Digitalis, American Grown Drug 258
Fat-free Tincture 257, 258
Infusion, Stability of 118
Medication 117
Drug Plant Cultivation in New South Wales 429
In the United States, The Importance of (Youngken)..... 171
Prices for 1916, German (Mueller) 308
Drugs Below Standard 285
Standardization of, by the Use of Germinating Plants (Saylor)..... 8
Dyestuffs from Materials Native to Latin-American Countries.... 188

Editorials:
Massachusetts College of Pharmacy 132
Prof. Samuel Sadtler 324
The Age of Consolidation 324
Efficiency and Food 192
Emetine and Pyorrhœa Alveolaris 164, 424
Ethyl Bromide, Manufacture of 122
Experiments with House-fly Baits and Poisons 184

Fifty Years of Manufacturing Pharmacy and Biology (Parke, Davis and Company) 503
Fish-Liver Oils 263
Food and Efficiency 192
Color. Tartrazinal as a 285
Law Upheld, Illinois Pure 124
Foods, Diabetic 283
Formaldehyde in Pruritus Ani 573
Fraudulent Infantile Paralysis "Cures" 426

Gases, The "Noble": How the "Nitrogen" of a Generation Ago Has Been Made to Yield Six, and Possibly Seven, Elements and the Value of this Discovery to Chemistry (Talbot) 220
Gelsemium Root, Sempervirine from 120
German Drug Prices for 1916. (Mueller) 308
Germany and the War 123
Grapes as an Article of Food 572

Hay Fever, Treatment of 573
Helmbold, Henry T., "The Buchu King" 23
Hexaiodine 263
Hexaphan 260
Higher Prices for Drugs 256, 418
Histidine-like Substances in the Pituitary Gland (Posterior Lobe) on the Presence of 279
Horsemint, Thymol from 287
Hydrogen and Its Industrial Application, The Technical Production of (Barnitz) 264
Hyoscyamus Cultivated in Minnesota. Moisture, Ash and Alkaloidal Content (Newcomb and Haynes) 1
Hypophosphites, Therapeutic Value of 261

Iodide, Silver, Some Experience in Preparing Emulsion of (Peacock) 452
Ivy, On the Constituents of Poison 519

Jalap, Brazilian 123

Kidney Cures Seized 36

Licorice Extract, The Constituents of Licorice Root and of. Part 2. (Houseman) 97
Root and Licorice Extract, The Constituents of. Part 2. Houseman 97
Lloyd, John Uri, Dinner to 528

Magnesium Hypochlorite as a Disinfectant 261
Massachusetts College of Pharmacy 132
Materia Medica and Pharmacy, Quarterly Review 113, 256, 416, 563
Medicinal Plants, The Cultivation of 37, 175
Medicines, Fifty Falsely Labelled 32
Long List of Other Misbranded 35
Mercury 121
Method for the Determination of Salol and Acetanilid in a Mixture of the Two and of Salol and Acetphenetidin in their Mixtures, A (Salkover) 484
Method for the Determination of Vanillin in Vanilla Extract, A New (Dox and Plaisance) 481
Metric System, General Use 418
Metrical Tragedy, A (Collins) 147
Mineral Waters, Federal Standards 259
Morphine in Pills and Tablets, Estimation of 124
Musk, Loss of Weight 260

Naphthene Oil 115
Solubility in Ammonia 423
National Association Boards of Pharmacy, Thirteenth Annual Convention of the (Newcomb) 520
National Formulary, Comments on 567
Nebula 569
New Zealand Government to Sell Kauri Gum 430
Nitrate Industry, The 189
Nitrogen Yields Six to Seven Elements 220
"Noble" Gases 220

Oak, The Poisonous Principle of Poison 519
Obituaries:
Bessey, Charles E. 44
Dodson, Charles G. 47
Eberle, Charles L. 47
Lacey, William H. 48
Polak, Jacobus 46
Scattergood, George Jones 48
Oil, Croton, Identification of 572
Olive, South Australian 573
Oils, Fish Liver 263
Opium Assay: Comparison of the Methods of the United States and British Pharmacopœias (Smith) 292
Indian 264
Ouabain 118
Oysters *vs.* Smelters 39

Pan-American Scientific Congress, Abstracts on Second 187
Papaverin, Pharmacologic and Clinical Study 424
Parke, Davis and Company, The Story of 503
Penicillium which Produces Oxalic Acid 125
Pennsylvania Pharmaceutical Association 416
Peppermint and Spearmint as Commercial Crops 37
The Assay of Spirit of (Thompson) 303
Petrolatum, Liquid 115
Petroleum and Asphalt in the United States 190
Pharmaceutical Association, American 88, 113, 463
Pennsylvania 416
Pennsylvania. Thirty-ninth Annual Meeting 376
Exhibit at the Philadelphia College of Pharmacy (Fischelis) 529
Exhibition in Philadelphia, The (Wilbert) 448
Faculties, American Conference of, Seventeenth Annual Convention 473
Pharmacist as the Future Municipal Chemist and Bacteriologist, The (Nelson) 145
Pharmacognosy in America, Some of the Early Teachers in (Kraemer) 385, 433
Pharmacopœia, United States, A Digest of Changes 432
Some Changes in the Ninth Decennial Revision (Beringer) 358
Comments on (Thum) 563
Pharmacopœial Standards for Whisky and Brandy (Beringer) 49
Pharmacopœias, United States and British, Opium Assay: Comparison of the Methods of the (Smith) 292
Pharmacy in America, The Future of (Nelson) 65
National Association Boards of, Thirteenth Annual Convention of the (Newcomb) 447, 520
Quarterly Review on the Advances in Materia Medica and (Thum) 113, 256, 416, 563

Phenol, Some Fallacies Regarding (Wilbert) 364, 425
Toxic Properties of, A Review With Reports of Observations on the Influence of Ethyl Alcohol on the Germicidal and on the (Wilbert) 364, 425
Philadelphia College of Pharmacy:
Abstract of Address of the President 234
Abstracts from the Minutes of Board of Trustees 94, 223, 380, 525
Annual Meeting 228
Dinner to Prof. Samuel P. Sadtler 575
Fiftieth Anniversary Alumni Celebration 336
Minutes of the Quarterly Meeting 93, 378
Minutes of the Semi-Annual Meeting 523
Ninety-fifth Annual Commencement 329
Pharmaceutical Exhibit 231
Pharmaceutical Meetings, Committee 231
Report of Curator 231
Report of Editor 229
Special Lectures 41
Philadelphia Drug Exchange 138
Phosphate Rock, Treating 41
Phosphorus, Stability of Preparations Containing Yellow 120
Pine Forests, Chemical Research as a Directing Aid in the Efficient Utilization of 191
Plaster of Paris, Alcohol for Retarding the Setting 423
Pleurotus Japonicus, A Luminous Fungus 573
Piper Methysticum, The Vascular Anatomy of (Hoffstadt) 485
Price Legislation 261
Prices of Drugs, Higher 256, 418
Progress in Applied Science 39
Plants, Germinating, Standardization of Drugs by the Use of (Saylor) 8
Some Relations of, to Distilled Water and Certain Dilute Toxic Solutions (Merrill) 12, 71
Pure Food Laws of Illinois Upheld 124
Pyorrhœa Alveolaris. Preliminary Report on Treatment With Ipecac and Emetin Hydrochloride (Ruoff) 164
Emetine Salts and 424

Quebracho, Concession Asked for Plant in Paraguay 429
Quicksilver 121

Radium Emanation in Spring Water 571
Reviews, Book:
American Medical Association. Annual Reports of the Chemical Laboratory 574
New and Non-official Remedies, 1916, Containing Descriptions of the Articles Which Have Been Accepted prior to January 1, 1916.. 227
Carey, Harry W. An Introduction to Bacteriology for Nurses.. 29
Donaldson, Henry H. The Rat, Chemical Laboratory, American Medical Association 131
Pharmacopœia of the United States of America, Ninth Decennial Revision 371
Schimmel & Co., Bericht von. (Inhaber Ernst, Karl u. Hermann Fritsche) in Miltitz Bez. Leipzig, über Atherische Öle, Riechstoffe u. s. w., October, 1915 30
Squire's Companion to the British Pharmacopœia (1914)..... 373
Stevens, William Chase. Plant Anatomy from the Standpoint of the Development and Functions of the Tissues and Handbook of Micro-technic 278

Supplement to the British Pharmaceutical Codex, 1911, including Additions, Alterations, and Corrections 130
Wellcome Photographic Exposure Record and Diary, 1916..... 30
Wilbert, Martin I. Digest of Comments on the Pharmacopœia of the United States of America and the National Formulary for the Calendar Year Ending December 31, 1914 227
Winton, Andrew L. The Microscopy of Vegetable Foods..... 276
Root Beer, Home-made, The Percentage of Alcohol in (LaWall)..... 355

Sadtler, Prof. Samuel P., Complimentary Dinner to 575
Salol and Acetanilid in a Mixture of the Two, and of Salol and Acetphenetidin in their Mixtures, A Method for the Determination of (Salkover) 484
Saw Palmetto 517
Schimmel's Report 122
Sempervirine 120
Silver Iodide, Emulsion of (Peacock) 452
Senega, The Official Preparations (Mueller) 241
Serums, Principles Underlying Use of 120
Smelters *vs.* Oysters 39
Soap Manufacture, Historical Review 259
Sodium Chloride, Pure..... 572
Hydroxide Destroys Anthrax Spores 419
Some Instances of How the Pharmacist Serves the Public 431
Relations of Plants to Distilled Water and Certain Dilute Toxic Solutions (Merrill) 12, 156
Spearmint and Peppermint as Commercial Crops 37
Spices as Preservatives 570
Standardization of Drugs by the Use of Germinating Plants (Saylor) 8
State Board Examinations (Morland) 253
Why Applicants Fail to Pass (Beringer, Jr.)..... 403
Stramonium Leaves from South Africa and the Soudan..... 422
Strontium Salicylate 125
Strophanthin 118
Sumbul Root, Some Constituents of (Heyl and Hart) 546
Syrup, Chocolate 580
Ferrous Iodide 580

Tanning Materials from Native Sources in Latin-American Countries 187
Tarantism and the Dancing Mania 282
Tartrazine as a Food Color 285
Thymol from Horsemint 287
Tincture of Digitalis, Fat-Free 257, 258
Tinctures 123

U. S. Pharmacopœia, Changes in IX Revision (Beringer)..... 358
Comments on (Thum) 563
Standards for Whisky and Brandy 49

Vaccines, Principles Underlying Use of 120
Vanilla Extract, A New Method for the Determination of Vanillin in (Dox and Plaisance) 481
Vitamines and Nutritional Diseases: A Stable Form of Vitamine, Efficient in the Prevention and Cure of Certain Nutritional Deficiency Diseases. (Seidell) 410

Waters, Bottled, Sanitary Condition of 286
Medicated (Thum) 401
Mineral, Federal Standards 259
Whisky and Brandy, Pharmacopœial Standards for (Beringer)..... 49

Philadelphia College of Pharmacy

FOUNDED 1821

OFFICERS OF THE COLLEGE

President
HOWARD B. FRENCH

Vice-Presidents
RICHARD V. MATTISON — JOSEPH L. LEMBERGER

Corresponding Secretary
ADOLPH W. MILLER

Recording Secretary
C. A. WEIDEMANN

Treasurer
WARREN H. POLEY

Board of Trustees

SAMUEL P. SADTLER	C. MAHLON KLINE
WILLIAM L. CLIFFE	JOSEPH W. ENGLAND
HENRY K. MULFORD	GEORGE M. BERINGER
AUBREY H. WEIGHTMAN	JOSEPH P. REMINGTON
SAMUEL C. HENRY	C. STANLEY FRENCH
OTTO W. OSTERLUND	GEORGE B. EVANS
JACOB M. BAER	EDWIN M. BORING
RICHARD M. SHOEMAKER	THEODORE CAMPBELL
WALTER A. RUMSEY	CHARLES LEEDOM

Editor HENRY KRAEMER — **Curator** JOSEPH W. ENGLAND — **Librarian** KATHERINE E. NAGLE

FACULTY

JOSEPH P. REMINGTON, Dean
JULIUS WILLIAM STURMER, Associate Dean

SAMUEL P. SADTLER	CHARLES E. VANDERKLEED
CLEMENT B. LOWE	FRANK E. STEWART
HENRY KRAEMER	JOSEPH H. EHMAN
FRANK X. MOERK	WALLACE S. TRUESDELL
JOHN A. RODDY	ALFRED HEINEBERG
CHAS. H. LaWALL	JOSEPH L. WADE
FREEMAN P. STROUP	ROBERT P. FISCHELIS
E. FULLERTON COOK	J. EDWARD BREWER
CHALMERS J. ZUFALL	PAUL S. PITTENGER
HEBER W. YOUNGKEN	IVOR GRIFFITH

Regular Courses in Pharmacy—Course in Food and Drug Analysis—Special Courses in Chemistry, Bacteriology, and Microscopy.

Bulletins relating to these courses may be obtained from **the Registrar, Jacob S. Beetem, 145 North Tenth Street.**